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ENVIRONMENTAL LAW

AN OVERVIEW OF THE CLEAN AIR ACT AMENDMENTS OF 1990

By
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This Article is dedicated to the late Representative Mickey Leland in recognition of his efforts to protect the public health from hazardous air pollution. The author gratefully acknowledges the assistance of Gregory Weststone, Philip Barnett, and Philip Schliro in preparation of this Article.

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I. INTRODUCTION

The Clean Air Act Amendments of 1990 (1990 Amendments) represent the culmination of a decade of debate and controversy. Signed into law on November 15, 1990, this historic legislation establishes an aggressive regime of new control requirements to address four crucially important air pollution problems: urban smog, hazardous air pollution, acid rain, and depletion of the stratospheric ozone layer. Accompanying the new substantive requirements are enhanced enforcement authorities, expanded opportunities for citizen lawsuits, and a sweeping new permit program, all designed to facilitate the difficult task of implementing the Clean Air Act's (CAA) pollution control requirements.

This Article provides an overview of the new clean air law, including a historical perspective on how the legislation emerged from years of protracted debate, a discussion of major themes in the law and their implications regarding trends in national environmental legislation, a title-by title overview of the central provisions of the legislation, and a final assessment of the 1990 Amendments.

II. BACKGROUND: THE CLEAN AIR DEBATE THROUGH THE 1980S

When President Bush signed the 1990 Amendments into law on November 15, 1990, he ended one of the longest—and hardest fought—legislative battles in recent congressional history.

Throughout the 1980s, thousands of hours were spent developing, debating, and blocking legislative proposals; hundreds of witnesses testified at hearings;¹ and millions of dollars were spent on lobbying by interest groups. Eventually, the Speaker of the House and the Senate Majority Leader both had to personally participate in negotiations to resolve specific issues. The product

¹ See COMMITTEE ON ENERGY AND COMMERCE, REPORT OF THE CLEAN AIR ACT AMENDMENTS OF 1990, H.R. REP. NO. 490, 101st Cong., 2d Sess., pt. 1, at 403 (1990) (listing all the House hearings from 1981 to 1990).

of all this effort is a sweeping collection of programs that dwarfs previous environmental laws. Any one of the 1990 Amendments' five major titles would ordinarily be an act in itself.

Litigation will inevitably follow the 1990 Amendments. Unhappy interest groups are already suggesting that Congress acted hastily and included some provisions by oversight or mistake.² However, Congress had ten years to consider clean air policy choices and evaluate alternatives. As one who has participated in the reauthorization battle since its first day, I can attest that, in recent experience, no legislation has received more scrutiny during its consideration. Congress's policy decisions were informed choices. To help understand those choices and the extraordinary change in the debate as the decade unfolded, this Section discusses the nearly ten years of congressional clean air debate that preceded passage of the 1990 Amendments.

Ronald Reagan's criticism of the CAA in 1980 foreshadowed the reauthorization battle to come. Then, in March 1981, the National Commission on Air Quality, which had been created by Congress in the Clean Air Act Amendments of 1977, fired the first shot.³ Although the Commission recommended keeping the CAA's basic standards and health goals, it concluded that attainment deadlines, tailpipe standards, and the prevention of significant deterioration (PSD) program all could be dramatically weakened.⁴ Several of the Commission's members strongly dissented from these findings.⁵

Pressure to amend the CAA originated with industry. With the CAA's authorization set to expire at the end of September 1981, leading business groups began calling for a fundamental re-

2. For instance, just one month after passage of the 1990 Amendments, Mobil published an advertisement attacking the provisions requiring the reformulation of gasoline. *Cous, Bulls, and Clean Air*, N.Y. Times, Dec. 13, 1990, at A31, col. 1. The Mobil advertisement in turn provoked a series of congressional responses. See N.Y. Times, Jan. 1, 1991, at 28, col. 4 (letter to the editor from Senator Daschle); N.Y. Times, Feb. 6, 1991, at A20, col. 3 (letter to the editor from Representative Waxman).

3. See NATIONAL COMM'N ON AIR QUALITY, TO BREATHE CLEAN AIR (1981). The Clean Air Act Amendments of 1977, Pub. L. No. 95-95, sec. 106, § 323, 91 Stat. 665, 691 (codified at 42 U.S.C. § 7409(a) (1988)), established the National Commission on Air Quality.

4. NATIONAL COMM'N ON AIR QUALITY, *supra* note 3, at 55-66.

5. *Id.* at 326-43.

vision that would scrap the law's health standards.⁶ In response, Senator Robert Stafford (R. Vt.), Chairman of the Senate Committee on Environment and Public Works, presciently warned: "If the White House or industry groups make unreasonable demands for change we will have a contentious and lengthy period of legislating."⁷

The Reagan Administration's intent became clear in June 1981. The Administration's draft reauthorization proposal went far beyond the recommendations proposed by the National Commission on Air Quality: it made enforcement lawsuits optional, entirely eliminated the PSD program, doubled tailpipe standards, eliminated motor vehicle emission control durability requirements, and deleted the law's secondary standards designed to protect agriculture and general welfare.⁸ Industry was quite pleased with the draft. As one lobbyist said, "I don't see anything we'd object to yet."⁹

Not everyone agreed with that sentiment, and the immediate uproar over the proposal may have helped convince President Reagan to abandon his promise to submit actual legislative language to Congress.¹⁰ Instead, on August 5, 1981, the Reagan Administration issued eleven clean air "principles" that it urged Congress to adopt.¹¹ While these principles were more modest

6. Shabecoff, *Industry Groups Seeking Changes in Clean Air Law*, N.Y. Times, Mar. 21, 1981, at 24, col. 1; Pastor, *Attempts to Soften Basic Clean Air Laws May Bring Major Struggle, Some Changes*, Wall St. J., May 8, 1981, at 52, col. 1.

7. Shabecoff, *Clean Air Act: A Barometer of Changes*, N.Y. Times, July 1, 1981, at A16, col. 1. Senator Stafford retired from the Senate in 1987. His remarkable efforts through the 1980s are a key reason that the law remained intact.

8. Representative Waxman publicly released the Reagan Administration's draft on June 19, 1981. It would have repealed or relaxed 115 provisions of the existing law. See Shabecoff, *Democrat Discloses Reagan Draft Document Easing Clean Air Standards*, N.Y. Times, June 20, 1981, at 10, col. 1; Omang, *EPA Revision of Clean Air Act Leaves a 'Shell'*, *Waxman Says*, Wash. Post, June 6, 1981, at A3, col. 4.

9. Omang, *supra* note 8, at A3, col. 3.

10. The Administration had promised to send its legislative package to Congress by June 30, 1981. However, internal disagreements over whether to propose changes to the national ambient air quality standards (NAAQS), and political concerns over the strong public reaction to environmental issues, slowed the Administration's progress. Shabecoff, *Reagan Delaying Proposals for Clean Air Act*, N.Y. Times, July 28, 1981, at A1, col. 4.

11. INSIDE EPA WEEKLY REPORT, SPECIAL REPORT, Aug. 7, 1981, at 3.

than the June draft, they still represented a fundamental assault on the CAA.¹²

In December 1981, legislation, H.R. 5252, was finally introduced. H.R. 5252 embodied the Reagan Administration's eleven principles and dramatically weakened the CAA.¹³

As 1982 began, many observers believed H.R. 5252 had an excellent chance of passage.¹⁴ The bipartisan bill was strongly supported by leading members of the House Energy and Commerce Committee, several large unions, and a powerful industry coalition.¹⁵ Moreover, the Reagan Administration, which was enthusiastically supporting the bill, had enjoyed spectacular successes in pushing its legislative agenda through Congress in 1981.¹⁶

When H.R. 5252 reached the Energy and Commerce Committee for consideration, it dramatically weakened standards for cars, allowed pollution in national parks to double, and relaxed the law's requirements for nearly all polluters. Six months later, however, after numerous dramatic mark up sessions, a series of

12. Some commentary was especially direct. The *Chicago Tribune*, for instance, editorialized: "As regards automobile exhaust, the administration is being positively idiotic." *Mr. Reagan vs. Clean Air*, Chi. Tribune, Aug. 11, 1981, § 1, at 10, col. 1.

13. H.R. 5252 was introduced on December 16, 1981, which was the last day of the first session of the 97th Congress. The legislation would have eviscerated the mobile source provisions of the 1977 law. Among other provisions, it would have doubled the carbon monoxide (CO) standard to seven grams per mile (gpm), doubled the NO_x standard to two gpm, given the EPA Administrator authority to weaken the standard to any level after 1986, and allowed fleet averaging in determining compliance with the standards. See 127 CONG. REC. 31,981-86 (1981) (summarizing H.R. 5252).

14. *Pastor, Bipartisan Bill to Ease Clean-Air Laws To Be Pushed in Congress by White House*, Wall St. J., Jan. 8, 1982, at 6, col. 3.

15. The bill's lead sponsor was Representative Tom Luken (D. Ohio); he was joined by, among others, the Chairman of the Energy and Commerce Committee, Representative John Dingell (D. Mich.); the Committee's Ranking Republican, Representative James Broyhill (R. N.C.); and the Ranking Republican on the Health and the Environment Subcommittee, Representative Edward Madigan (R. Ill.).

16. President Reagan was extraordinarily successful in enacting his domestic program, highlighted by his tax and budget proposals, in 1981. *Reagan Victories Dominate Key Votes of 1981*, 1981 CONG. Q. ALMANAC 3-C (1981); *97th Took Bold Steps to Reduce Federal Role*, 1981 CONG. Q. ALMANAC 14 (1981); *Romance and Fidelity of Reagan Honeymoon on Hill*, 1981 CONG. Q. ALMANAC 18-C (1981).

strengthening amendments adopted by narrow margins had changed the dynamic of the legislative process.¹⁷ Although the amended version of H.R. 5252 still gave many industries, most notably the auto companies, weakened requirements, it imposed tougher standards for some businesses. As a result, the industry coalition in support of its passage fragmented, and mark up of the legislation was suspended in August 1982. H.R. 5252 was never reported from the Committee and its demise ended the fundamental assault on the CAA.

Never again would the Reagan Administration or industry mount as broad or persistent an attack on the CAA's standards and goals. After 1982, the focus shifted to proposals that strengthened the CAA by creating new programs to address the acid rain and toxic air pollution problems.¹⁸

Acid rain control proposals were reported out of the Senate Committee on Environment and Public Works in the 97th, 98th, and 100th Congresses.¹⁹ However, these measures were not considered on the Senate floor, in part because of the strong opposition of Senate Majority Leader Robert Byrd (D. W.Va.), and in part because many Senators felt that floor action was premature

17. The adoption of three key amendments damaged the united business coalition. The first, offered by Representative Tim Wirth (D. Colo.) on April 20, 1982, strengthened the bill's attainment deadline dates. The second, offered by Representative Ron Wyden (D. Or.) on April 28, kept the law's prevention of significant deterioration (PSD) program intact. Last, an amendment offered by Representatives Jim Florio (D. N.J.) and Billy Tauzin (D. La.) on August 11, 1982, imposed tougher requirements for hazardous air pollutants. See Plattner, *Growing Actimony Marks Clean Air Rewrite*, 40 CONG. Q. WEEKLY 953 (1982); Plattner, *Clean Air Bill Stalled in House Committee*, 40 CONG. Q. WEEKLY 1019 (1982); Roberts, *Administration Fails in Key Votes to Ease Pollution Standards*, N.Y. Times, Aug. 12, 1982, at A1, col. 3; Marcus, *21-20 Vote in Committee Preserves Clean Air Act From Industry Changes*, Wash. Post, Aug. 12, 1982, at A4, col. 1; Barone, *Tactics of an Ace in the Congressional Air Wars*, Wash. Post, Dec. 14, 1982, at A27 (Editorial Page), col. 2.

18. Although authorizations for appropriations for the law expired on September 20, 1981, see 42 U.S.C. § 7626(a) (1988), Congress continued funding through continuing appropriations bills. On June 2, 1983, the House debated whether sanctions should go into effect for cities not meeting the attainment standards. The Danemeyer-Waxman Amendment, which barred EPA from imposing such sanctions, passed by a margin of 227 to 136. 129 CONG. REC. H3500-18 (daily ed. June 2, 1983).

19. See COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS, CLEAN AIR ACT AMENDMENTS OF 1989, S. REP. 228, 101st Cong., 1st Sess. 4 (1989).

until legislation was approved by the House Energy and Commerce Committee.

In the House in June 1983, several members, led by Representative Gerry Sikorski (D. Minn.), worked to develop an acid rain control bill that provided for reduced emissions while minimizing regional economic impacts. For the first time, legislation (H.R. 3400) dealt with acid rain as a national problem. The key elements of the bill were a ten million ton reduction in sulfur dioxide (SO₂) emissions, a four million ton reduction of nitrogen oxides (NO_x) emissions, and a nationwide fee to help pay for clean up costs.²⁰ Despite the enormous federal subsidies that the bill would have provided to the Midwest, it was Midwestern members who cast the deciding votes against the measure.²¹

In the 99th Congress, a new bill, H.R. 4567, developed by Representative Sikorski and Representative Conte (R. Mass.) attracted broad support and was approved by a sixteen to nine vote in the Health Subcommittee.²² The utility and coal industries

20. H.R. 3400 targeted the dirtiest plants in the country and required them to install pollution control technology. The federal government would have levied a nationwide fee to pay for 90% of these control costs. Also, standards for NO_x emissions from mobile sources would have been tightened, rather than weakened as in H.R. 5252. The Health and Environment Subcommittee held extensive hearings on H.R. 3400, including several midwestern field hearings. *Proposed Amendments to the Clean Air Act: Hearings on H.R. 3400 Before the Subcomm. on Health and Environment of the Energy and Commerce Comm., U.S. House of Representatives*, 98th Cong., 1st & 2d Sess. (1983-1984) (field hearings were held in Minneapolis, Cleveland, Indianapolis, Chicago, and New York City). There was extensive commentary on H.R. 3400. See *The Cost of Sweetening the Rain*, N.Y. Times, Sept. 3, 1983, at 22 (Editorial Page), col. 1; *Utilities Assail Acid Rain Tax*, L.A. Times, Aug. 16, 1983, at A1, col. 4; Sikorski, *To Fight Acid Rain*, N.Y. Times, Nov. 1, 1983, at A27, col. 2; *Hard Questions in Acid-Rain Control Are Who Benefits and Who Must Pay*, Wash. Post, Jan. 29, 1984, at A1, col. 4.

21. Although H.R. 3400 had over 100 cosponsors from around the country, its provisions were stripped from a clean air mark-up vehicle by a 10 to 9 vote on May 2, 1984. More than three billion dollars from other states collected through a fee on electricity would have been directed to help with the costs of acid rain control in the Midwest. Ironically, however, four of the 10 votes against the bill came from Midwestern members. Davis, *Acid Rain Provisions Cut From Clean Air Bill*, 42 CONG. Q. WEEKLY 1009 (1984).

22. H.R. 4567 retained H.R. 3400's 10 million ton reduction requirement, but it no longer required technology to be used to achieve reductions and only had potential, not mandatory, cost-sharing. It gained broader support than H.R. 3400; over 150 members cosponsored the legislation. *A New Acid Rain Bill*, Wash. Post, Apr. 30, 1986, at A24 (Editorial Page), col. 1; see also Stern, *Acid Rain Measure*

spent millions of dollars in opposing the bill, however, and it was never substantively considered in the Energy and Commerce Committee. In fact, more money was spent lobbying against H.R. 4567 than any other bill in 1986, including the omnibus tax package adopted that year.²³

Bills that would have strengthened the CAA's program for control of hazardous air pollutants were also introduced between 1983 and 1986, but they too were nixed in Committee.²⁴ Although not sufficient to move the legislation forward, dramatic events—especially the tragic Bhopal accident—riveted the world and focused attention on the dangers of toxic air pollutants.²⁵

Faces Very Cloudy Future, 44 CONG. Q. WEEKLY 2041 (1986) (discussing the reasons for opposition to H.R. 4567).

23. A study by the Associated Press concluded that the Citizens for Sensible Control of Acid Rain, a utility lobby group, spent over three million dollars in opposition to H.R. 4567. *Acid-Rain Lobby Led 1986 Spending*, N.Y. Times, June 1, 1987, at B7, col. 4.

24. The Wirth-Waxman bill (H.R. 5084) was introduced in 1984 during the 98th Congress. The bill would have required EPA to determine by 1987 whether 35 substances were hazardous air pollutants. See H.R. 5084, 98th Cong., 2d Sess. § 3 (1984). Although the provisions of H.R. 5084 were part of the mark-up vehicle containing acid rain legislation, its provisions were never voted on. The markup ended when the acid rain provisions were stripped from the bill. See *supra* note 21. In 1985 (the 99th Congress), the new version of the Wirth-Waxman bill (H.R. 2576, 99th Cong., 1st Sess. (1985)) was more comprehensive and stringent than H.R. 5084. H.R. 2576 listed 85 substances as hazardous substances and required EPA to set appropriate emission standards. The legislation also required EPA to collect emission information from polluters, provided communities with the right to know toxic pollution levels, and required facilities to adopt leak prevention and emergency response procedures. See *Toxic Release Control Act of 1985: Hearings Before the House Subcomm. on Health and the Environment of the Comm. on Energy and Commerce*, 99th Cong., 1st Sess. (1985). See also Waxman, *Toxic Chemicals in our Air Supply: The Need for Action to Protect the Public Health*, 35 J. AIR POLLUTION CONTROL ASSOCIATION 1021 (1985); *Air Toxics Debate Clouded by Mistrust*, *Philosophical Debate Over Remedies*, Nat'l J., June 29, 1985, 1516-20; *Toxic Air and the E.P.A. Tortoise*, N.Y. Times, June 17, 1985, at A18 (Editorial Page), col. 1; *It Can't Be Shrugged Off*, L.A. Times, Aug. 14, 1985, at § 2, 4 (Editorial Page), col. 1; Peterson, *House Chairman's Opposition May Doom Cleaner-Air Bill*, Wash. Post, June 12, 1985, at A14, col. 1. Although the chemical industry and Reagan Administration strongly opposed both H.R. 2576 and H.R. 5084, the 1990 Amendments are more expansive and regulate significantly more substances than either bill.

25. More was written about Bhopal than any other clean air issue in the 1980s. In fact, according to the Congressional Research Service, 391 stories were written about the accident in six major newspapers in December 1984. The accident occurred when a storage tank ruptured and released 60,000 pounds of methyl

The scope of America's toxic air pollutant problem became apparent in 1985, when the Subcommittee on Health and the Environment conducted the first nationwide survey of toxic emissions. Since companies were not legally required to produce the information, the data was incomplete. Still, the total emissions reported exceeded eighty million pounds.²⁶

Later that year, during consideration of the Superfund legis-

isocyanate into the air. Over 2,500 people died from the accident, and over 100,000 more were left with permanent disabilities. See *Hazardous Air Pollutants: Hearings Before the Subcomm. on Health and the Environment of the House Comm. on Energy and Commerce*, 98th Congress, 2d Sess. 4 (1984); see also *Release of Poison Gases and Other Hazardous Air Pollutants From Chemical Plants: Hearing Before the Subcomm. on Health and the Environment and Subcomm. on Commerce, Transportation, and Tourism of the House Comm. on Energy and Commerce*, 99th Congress, 1st Sess. (1985) [hereinafter *Poison Release Hearings*]. The *New York Times* generally provided the best coverage of Bhopal. See McFadden, *India Disaster: Chronicle of a Nightmare*, N.Y. Times, Dec. 10, 1984, at A1, col. 1; Diamond, *The Bhopal Disaster: How It Happened*, N.Y. Times, Jan. 28, 1985, at A1, col. 1; Diamond, *The Disaster in Bhopal: Workers Recall Horror*, N.Y. Times, Jan. 30, 1985, at A1, col. 1; Diamond, *The Disaster in Bhopal: Lessons for the Future*, N.Y. Times, Feb. 3, 1985, at 1, col. 2; Diamond, *Union Carbide's Inquiry Indicates Errors Led to India Plant Disaster*, N.Y. Times, Mar. 21, 1985, at A1, col. 1. See also Roth, *U.S. Chemical Industry May Be Facing A Fresh Wave of Regulatory Legislation*, Wall St. J., Dec. 17, 1984, at 4, col. 1; *All The World Gaped*, Time, Dec. 17, 1984, at 20-31; Davis & Green, *Bhopal Tragedy Prompts Scrutiny by Congress*, 42 CONG. Q. WEEKLY 3147 (1984); Taylor, *Union Carbide Internal Report Warned of Hazards at U.S. Plant*, Waxman Says, Wall St. J., Jan. 25, 1985, at 2, col. 2. A subsequent accident at a Union Carbide plant in Institute, West Virginia that caused 135 people to be hospitalized also received broad media attention. See Franklin, *Toxic Cloud Leaks at Carbide Plant in West Virginia*, N.Y. Times, Aug. 12, 1985, at A1, col. 6; Diamond, *Carbide Blames A Faulty Design for Toxic Leak*, N.Y. Times, Aug. 13, 1985, at A1, col. 2; Diamond, *Carbide Leak Highlights Defects in Systems Handling Toxic Matter*, N.Y. Times, Aug. 19, 1985, at A1, col. 1; Diamond, *Carbide Assets String of Errors Caused Gas Leak*, N.Y. Times, Aug. 24, 1985, at 1, col. 1.

The attention from the Bhopal and Institute accidents prompted EPA to study toxic chemical accidents in the United States. See Diamond, *U.S. Toxic Mishaps in Chemicals Put At 6,928 in 5 Years*, N.Y. Times, Oct. 3, 1985, at A1, col. 1.

26. The Subcommittee released the survey at a hearing on March 26, 1985. See *Poison Release Hearings*, *supra* note 25, at 1. See also Diamond, *Very High Levels of Toxic Material Are Found In the Air*, N.Y. Times, Mar. 26, 1985, at A1, col. 3; Diamond, *Problem of Toxic Emissions*, N.Y. Times, May 20, 1985, at D1, col. 3; Taylor, *Plants Routinely Emit 'High' Amounts of Hazardous Chemicals*, Waxman Says, Wall St. J., Mar. 27, 1985, at 8, col. 1; Davis, *Bill on Toxic Pollutants Picking Up Support*, 43 CONG. Q. WEEKLY 602 (1985).

lation, Congress adopted a provision that, for the first time, required companies to systematically report their toxic emissions.²⁷ The first comprehensive report of the Toxic Release Inventory was released in March 1989. It indicated that 2.7 billion pounds of toxic air pollutants were released into the air in 1987.²⁸

Many believed that clean air legislation would finally be passed in the 100th Congress (1987-1988), especially since any city not attaining the federal air quality standards would face CAA sanctions after December 31, 1987.²⁹ This meant that the law's nonattainment provisions once again joined acid rain and toxic air pollution on the congressional agenda.

In the House, committee-wide negotiations on acid rain and nonattainment legislation began in July 1987.³⁰ Despite the pres-

27. Superfund Amendments and Reauthorization Act of 1986, Pub. L. No. 99-499, secs. 300-330, 100 Stat. 1613, 1728-58 (codified at 42 U.S.C. §§ 11001-11023 (1988)). The right to know amendment passed the House on December 10, 1985 by the slimmest margin possible: 212 to 211. 131 CONG. REC. H11,590-94 (daily ed. Dec. 10, 1985).

28. I joined with Representatives Mickey Leland (D. Tex.) and Gerry Sikorski (D. Minn.) in releasing this information, which provided the public with an estimate of the quantity of hazardous pollutants released into the air in 1987. The National Toxic Release Inventory: Preliminary Air Toxic Data, Subcommittee on Health and the Environment (Mar. 1989). When the official EPA figures were released in June, they reflected an increase in the estimate of aggregate air toxic emissions from 2.4 billion pounds to 2.7 billion pounds. OFFICE OF TOXIC SUBSTANCES, U.S. EPA, THE TOXIC RELEASE INVENTORY: A NATIONAL PERSPECTIVE (1989). See also Weiskopf, *U.S. Air Pollution Exceeds Estimates*, Wash. Post, Mar. 23, 1989, at A1, col. 2; Shabecoff, *U.S. Calls Poisoning of Air Far Worse Than Expected and Threat to Public*, N.Y. Times, Mar. 23, 1989, at B11, col. 1; *Is Breathing Hazardous to Your Health?*, NEWSWEEK, Apr. 3, 1989, at 25.

29. Stern, *Acid Rain: Both Sides Ready to Resume Battle*, 44 CONG. Q. WEEKLY 3144-46 (1986); Shabecoff, *Air Cleanup: Clash of Aims; Help for One Region May Harm Another*, N.Y. Times, Nov. 12, 1987, at A22, col. 6.

30. The negotiations initially focused on two bills: H.R. 2666, 100th Cong., 1st Sess. (1987), and H.R. 3054, 100th Cong., 1st Sess. (1987). H.R. 2666 was the 100th Congress's version of H.R. 4567 (the Sikorski acid rain bill that was introduced in 1986). H.R. 3054, the Waxman-Lewis bill, set out a comprehensive revision of the CAA's nonattainment provisions. H.R. 3054 established the policy, which was eventually adopted in the 1990 Amendments, of graduating the length of deadline extensions and the extent of required control measures according to the severity of a city's pollution problem. Compare H.R. 3054, 100th Cong., 1st Sess. § 182 (1987) with Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 182, 104 Stat. 2399, 2426-43 (codified at 42 U.S.C.A. § 7511a (West Supp. 1991)). In the Senate, a comprehensive rewrite of the law passed the Senate Environment Committee on October 22, 1987 by a 14 to 2 vote. S. 1351, 100th

sure of sanctions, the talks stretched for months, and it soon became clear that legislation would not be enacted by the December 31, 1987 deadline.

The impending deadline and the expectation of sanctions on almost every major urban area at the end of 1987 precipitated one of the most important clean air votes of the decade. To forestall sanctions, the Reagan Administration and industry lined up behind an amendment that would have extended the attainment deadlines by two years, to December 31, 1989, effectively removing any pressure on Congress to complete the reauthorization process before the next elections. In an effort to promote more rapid consideration of clean air legislation, I joined with Representative Conte in supporting an alternative amendment that would extend the deadlines for only eight months, until August 31, 1988.³¹ The extension vote offered the first test of House sentiment on the CAA in many years, and it came to be seen as an important test of floor support for both sides. Despite public predictions by industry that the two-year amendment would pass easily, the Conte-Waxman amendment prevailed by a ninety-five vote margin (257 to 162).³² Similar action in the Senate gave new hope that legislation could be completed in 1988.

Subcommittee markups and negotiations in the House continued throughout 1988, right up to the weeks immediately preceding final adjournment.³³ The new August 31, 1988 deadline passed, however, with no agreement in hand.

As the Congress closed, President Reagan was serving his last

Cong. 1st Sess. (1987).

31. Representative Conte made enormous contributions to the ten-year reauthorization fight. In addition to his work on the extension amendment, he was one of the most effective and persistent advocates for acid rain legislation. Congress suffered a tremendous loss when Silvio Conte died on February 8, 1991. See *Silvio Conte, Veteran Congressman*, L.A. Times, Feb. 9, 1991, at A30, col. 1.

32. The day before the vote, the Clean Air Working Group, an industry lobbying group, and congressional supporters of the two year amendment predicted an overwhelming victory. *House Rejects Long Delay of Clean Air Deadlines*, N.Y. Times, Dec. 4, 1987, at A27, col. 1; Davis, *House Sets Stage for Clean-Air Debate* in 1988, 45 CONG. Q. WEEKLY 2994 (1987). See 133 CONG. REC. H10,923-46 (daily ed. Dec. 3, 1987).

33. See Stanfield, *Punching at the Snog*, Nat'l J., Mar. 5, 1988, at 600-02; Davis, *Warman Scores Early Victory in Battle Over Clean-Air Bill*, 46 CONG. Q. WEEKLY 579-80 (1988); Davis, *Clean Air Proposals Multiply as Election Day Draws Closer*, 46 CONG. Q. WEEKLY 1675 (1988).

year in office, Senator Robert Byrd had announced he would no longer seek to be Senate Majority Leader, and nearly 100 cities were facing sanctions.

It seemed, finally, that legislation would be enacted in the next Congress.

Equally important, the nature of the clean air debate had changed dramatically since 1981. It had shifted from radical proposals to eliminate health standards and roll back automotive controls, to a series of bills that would toughen all parts of the law. This trend continued in 1989.

III. THE 101ST CONGRESS: LEGISLATION BECOMES LAW

1989 began with clean air at the top of everyone's legislative list. House Speaker Jim Wright (D. Tex.), in his opening statement for the 101st Congress, made passing a clean air bill one of the year's top objectives. Newly elected President George Bush not only pushed aside President Reagan's veto threat, but promised to introduce his own bill. In the Senate, Senator George Mitchell (D. Me.), the Senate's leading advocate for acid rain control, replaced Senator Byrd as Majority Leader.³⁴

It took every day of the 101st Congress, but legislation passed.³⁵ How it passed was extraordinary—few would have predicted that after a decade of constant skirmishing, a clean air bill would be completely considered on the House floor in only two days and have but one contested environmental amendment. Equally surprising, the final outcome, which all sides embraced, is stronger in almost every respect than the bills introduced and debated through the 1980s.³⁶

34. See Weisskopf, *A Changed Equation on Pollution*, Wash. Post, June 7, 1989, at A1, col. 4.

35. The House passed the conference report on October 26, 1990 (136 Cong. Rec. D1427, D1432 (daily ed. Oct. 26, 1990)), the Senate completed action on October 27, 1990, which was the last day of legislative activity for the 101st Congress (136 Cong. Rec. S17,434 (daily ed. Oct. 27, 1990)).

36. The bill became more comprehensive as the 101st Congress continued. Programs for control of ozone-depleting chemicals, the reformulation of gasoline, and visibility, all were incorporated into the package as the legislation moved forward. For a detailed comparison between the 1990 Amendments and earlier proposals, see *infra* notes 438-466 and accompanying text.

This Section will provide a broad picture of what unfolded in the 101st Congress. Moreover, it will touch on some of the more important elements that influenced the strength and scope of the new law.

In the broadest sense, the legislative activity in 1989-1990 was characterized by shifting momentum between the House, the President, and the Senate. The House and Senate generally followed completely different approaches to the legislation. In the House, long mark ups occurred in subcommittee and committee. By the time H.R. 3030 reached the House floor, agreements on virtually all issues were completed. In the Senate, subcommittee and committee markups were brief, but when S. 1630 reached the Senate floor, no agreements had been completed, and the bill was rewritten during eight weeks of floor consideration. Surprisingly, the Bush Administration, which moved the debate forward by submitting its own bill, was intensely involved in developing legislation in the Senate, but had virtually no role in House negotiations, or in the lengthy Conference Committee negotiations.

House action started early in 1989. Bills on nonattainment,³⁷ acid rain,³⁸ and toxic air pollutants³⁹ were all introduced by June 1989, and exhaustive hearings were held.⁴⁰ At the same time, press coverage of the legislation and the dangers of air pollution increased significantly,⁴¹ with national news magazines devoting

37. H.R. 2323, 101st Cong., 1st Sess. (1989); see Hager, *Smog Bill Toughens Standards For Car, Truck Emissions*, 47 CONG. Q. WEEKLY 1113 (1989).

38. See H.R. 1470, 101st Cong., 1st Sess. (1989).

39. H.R. 2585, 101st Cong., 1st Sess. (1989); See Hager, *New Air-Toxics Proposal Wins Environmentalists Backing*, 47 CONG. Q. WEEKLY 1395 (1989); Hager, *Industry Officials Seek Change in Air-Toxics Legislation*, 47 CONG. Q. WEEKLY 1539 (1989). H.R. 2585's chief sponsor, Representative Mickey Leland (D. Tex.), was a leading advocate of a strong CAA. Two months after he introduced H.R. 2585, Representative Leland died in a plane crash during a relief mission in Ethiopia. *Services for Leland*, N.Y. Times, Aug. 16, 1989, at B9, col. 2.

40. See *Acid Rain Control Proposals: Hearings Before the Subcomm. on Health and the Environment of the House Comm. on Energy and Commerce*, 101st Cong., 1st Sess. (1989) (hearings on H.R. 1470); *Clean Air Act Amendments (Part I): Hearings Before the Subcomm. on Health and the Environment of the House Comm. on Energy and Commerce*, 101st Cong., 1st Sess. (1989) (hearings on H.R. 2323); *Clean Air Act Amendments (Part III): Hearings Before the Subcomm. on Health and the Environment of the House Comm. on Energy and Commerce*, 101st Cong., 1st Sess. (1989) (hearings on H.R. 2585).

41. Individual subjects, such as the March 1989 report of the Toxic Release Inventory, which was discussed earlier, received extensive attention. See *supra*

their covers to the problem.⁴² This increased scrutiny was due in part to the dangerously high level of ozone pollution that accompanied the record setting heat in the summer of 1988,⁴³ and the release of the Toxics Release Inventory data on air toxic emissions.⁴⁴

Also contributing to the interest in this legislation was a growing environmental concern, which was fueled by the disastrous Exxon Valdez oil spill in Alaska's Prince William Sound, as well as the Bush Administration's reluctance to support an international agreement on protection of the stratospheric ozone layer,⁴⁵ and the twentieth anniversary of Earth Day.⁴⁶ This

note 26. The general subject of air pollution also received ample coverage throughout the Congress. See, e.g., Weisskopf, *Under EPA, A Regulatory Breakdown*, Wash. Post, June 4, 1989, at A1, col. 4; Weisskopf, *Tall Sticks and Acid Rain*, Wash. Post, June 5, 1989, at A1, col. 1; Weisskopf, *Legal Pollution That Makes Students Sick*, Wash. Post, June 6, 1989, at A1, col. 4; Weisskopf, *A Changed Equation on Pollution*, Wash. Post, June 7, 1989, at A1, col. 4.

42. McLoughlin, Carpenter, Cook & Platner, *Our Dirty Air*, U.S. News & World Rep., June 12, 1989, at 48; *Cleaning Up Our Mess*, NEWSWEEK, July 24, 1989, at 26.

43. The summer of 1988 caused 28 additional cities to be designated ozone nonattainment areas. Record pollution levels were documented across the eastern United States, even in remote rural areas. See *Clean Air Standards: Hearing Before the Subcomm. on Health and the Environment of the House Comm. on Energy and Commerce*, 101st Cong., 1st Sess. 35 (1989) (statement of Don Theiler, President, State and Territorial Air Pollution Program Administrators, and Director, Association of Local Air Pollution Control Officials). The surprising and dramatic increase in pollution levels undermined a persistent industry claim that air quality was improving and stronger control measures were unnecessary.

44. The magnitude of air toxic releases surprised air pollution experts, including those within the EPA, and shocked the general public. Moreover, the Toxic Release Inventory data for the first time provided the public with information on the level of hazardous emissions from industrial facilities in their communities. National awareness of the air toxics issue increased dramatically, and in many communities, industrial facilities faced new public pressure to reduce toxic emissions. See *supra* note 26 and accompanying text.

45. In early 1990, the Bush Administration opposed a draft international agreement to phase out ozone-depleting chemicals. The U.S. position, which was grounded in an opposition to \$25 million in U.S. aid to developing countries, was widely reported in the press. See, e.g., Weisskopf, *U.S. Intends to Oppose Ozone Plan*, Wash. Post, May 9, 1990, at A1, col. 6.

46. Earth Day commemorations were held around the world. Organizers of Earth Day estimate that 200 million people in 136 countries participated in events. Dolan & Stammer, *200 Million Worldwide Pay Respect to Earth*, L.A. Times, Apr. 23, 1990, at A1, col. 2.

heightened environmental awareness increased the pressure on Congress and the President to enact strong clean air legislation.

President Bush seized center stage in June when he announced, with Yellowstone National Park as his backdrop, that the Administration would soon send comprehensive clean air legislation to Congress.⁴⁷ That announcement, and the subsequent legislative package released on July 21, 1989⁴⁸ added a new and essential dynamic to the decade long fight. Whatever the merits of the President's proposal, his actions were a complete reversal of the Reagan Administration's position, and a dramatic step forward.⁴⁹

Although the President's bill included an innovative and strong acid rain control program, its nonattainment and toxic air pollution control programs were riddled with loopholes and lacked crucially important control measures.⁵⁰ Moreover, no program was included to address the increasingly important problem of depletion of the stratospheric ozone layer. Not surprisingly, while the final law contains large portions of the acid rain program essentially intact, it includes pervasive and sweeping changes in each of the other major program areas, and an entirely

47. The President announced his proposal on June 12, 1989. See Haber, *Bush Sets Clean-Air Debate in Motion With New Plan*, 47 CONG. Q. WEEKLY 1460-64 (1989). After the announcement and before actual legislation was introduced, the Bush bill was significantly revised and weakened. See Lancaster, *Clean Air Proposal Weakened*, Wash. Post, July 12, 1989, at A1, col. 6.

48. The President's bill was introduced in the House as H.R. 3030. Its main sponsor was Representative John Dingell (D. Mich.), Chairman of the House Energy and Commerce Committee. See Weiskopf, *Bush Presents Clean Air Package*, Wash. Post, July 22, 1989, at A5, col. 1; Hager, *Critics Disappointed by Details of Bush Clean-Air Measure*, 47 CONG. Q. WEEKLY 1852-53 (1989).

49. Hager, *The 'White House Effect' Opens A Long-Locked Political Door*, 48 CONG. Q. WEEKLY 139-44 (1990).

50. These inadequacies were detailed at a July 24, 1989 hearing of the Subcommittee on Health and the Environment. Some of the most important included introduction of emission averaging for passenger car tailpipe standards, relaxation of tall smokestack regulations, lack of any health standard for control of air toxic residual risks, the absence of mandatory sanctions for areas not implementing air quality plans, lax motor vehicle standards for NO_x, and failure to require onboard motor vehicle refueling controls. See *Clean Air Act Amendments (Part III): Hearing Before the Subcomm. on Health and the Environment of the House Comm. on Energy and Commerce*, 101st Cong., 1st Sess. (1989); Jehl, *Democrats Assail EPA Options in Bush Clean Air Plan*, L.A. Times, July 25, 1989, at A12, col. 1.

new program for protection of the ozone layer.

As the President was introducing his legislation, an important, unrelated development also occurred. For the first time since 1981, environmental advocates and a specific coalition of businesses reached an agreement that resolved a long-standing dispute on the length of warranties for emission control equipment. Although it was a minor part of the entire reauthorization,⁵¹ because it was the first compromise between traditional opponents, it had a lasting impact on the rest of the 101st Congress. No longer would business interests assume that their only option was to oppose clean air legislation supported by the environmental community.

Subcommittee markup in the House Health and the Environment Subcommittee began in September 1989. Most expected a combative, drawn out process with little progress in resolving individual issues.⁵² The markup did take several weeks, but it also produced a landmark agreement between Chairman Dingell (D. Mich.) and myself, which set out a comprehensive set of new controls to reduce emissions from all motor vehicles.⁵³ This compro-

51. The issue in dispute was the CAA five-year, 50,000-mile warranty for automobile pollution control equipment. Independent service stations wanted a shorter time period; environmentalists wanted to lengthen the warranty. The compromise, which was announced on August 2, 1990, decreased coverage for most equipment, but extended it for the major emission control components. For an analysis of the compromise and its impact on the legislative process, see Weiskopf, *Industries' Dance With the Devil on Cleaner Air*, Wash. Post, Dec. 24, 1990, at A13, col. 2. The compromise was enacted into law at Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 209(3), § 207(i), 104 Stat. 2399, 2484-85 (codified at 42 U.S.C.A. § 7541 note (West Supp. 1991)).

52. As one lobbyist said, "We sort of view this whole process [the subcommittee markup] as passing through puberty—then we get to the floor and really have some fun." Hager, *The Yin and Yang of Clean Air Debate Finally Reach a Political Nirvana*, 47 CONG. Q. WEEKLY 2622 (1989). Several amendments were defeated by close votes in the subcommittee. For a summary of subcommittee action on H.R. 3030, see Hager, *Bush Scores Early Victory in Clean Air Markup*, 47 CONG. Q. WEEKLY 2451-52 (1989); Hager, *Warman, Dingell Talk Truce on Auto Emission Rules*, 47 CONG. Q. WEEKLY 2551-52; Madison, *Midair Collision*, Nat'l J., Oct. 7, 1989, at 2491; Gold, *An Industry Coalition Frys*, N.Y. Times, Oct. 15, 1989, § 4, at 5, col. 1.

53. Weiskopf, *Clean Air Agreement is Reached*, Wash. Post, Oct. 3, 1989, at A1, col. 1; Ross, *Panel Supports Tougher Rules on Car Exhaust*, L.A. Times, Oct. 3, 1989, at A1, col. 6; Gold, *Shift in Fight on Air Rules*, N.Y. Times, Oct. 5, 1989, at B15, col. 1; Hager, *Energy Panel Seals Pact on Vehicle Pollution*, 47 CONG. Q. WEEKLY 2621-24 (1989); *There Can Be A Clean Air Bill*, N.Y. Times, Oct. 4, 1989,

mise established a model used throughout the legislative process in resolving other issues.⁵⁴

The markup also produced an extraordinarily embarrassing situation for the Bush Administration, when an amendment was offered that eviscerated the President's original proposal on alternative fuels. The Bush Administration was divided on the amendment's merits, with EPA Administrator William Reilly calling me and several others on the Subcommittee to announce that the Administration opposed the amendment, while White House Chief of Staff John Sununu simultaneously told other Members that the Administration took no position on the amendment. Despite the fact that this confusing split became public, the amendment passed by a narrow margin. This issue would haunt the Bush Administration throughout the reauthorization process.⁵⁵

The Senate became the central forum for the legislation once the Health and the Environment subcommittee completed its work. In October and November 1989, legislation was quickly approved in the Senate Public Works Committee, and Majority Leader Mitchell made it the first order of business for the second session.⁵⁶

At A28 (Editorial Page), col. 1; Gold, *After Years of Fighting, 2 Democrats Commit to Clean Air Act*, N.Y. Times, Oct. 15, 1989, at 30, col. 3; Miller, *Defender of Detroit and 'Polluters' Worst Enemy' Finally Clear the Air*, L.A. Times, May 25, 1990, at A23, col. 1; Greenwald, *Yearning to Breathe Free*, TIME, Oct. 16, 1989, at 50-51.

54. Not only was the tailpipe agreement the first major compromise reached in the process, but both sides committed to stand by it through conference. This mutual assurance made the agreement possible and applied to most future agreements. However, not all future agreements received such commitment. For instance, the acid rain compromise was only binding on members through floor action.

55. Weisskopf, *Key Provision of Bush Clean-Air Bill Under Siege*, Wash. Post, Oct. 10, 1989, at A4, col. 1; Weisskopf, *House Panel Votes To Weaken Clean-Air Bill*, Wash. Post, Oct. 12, 1989, at A1, col. 3; Gold, *Bush Proposal for Clean Air Is Dealt a Blow*, N.Y. Times, Oct. 12, 1989, at A30, col. 5; Hager, *Bush's Plan for Cleaner Fuels Scalded Back By House Panel*, 47 CONG. Q. WEEKLY 2700-01 (1989); Abramson, *Administration Revising Plan to Require Clean Alternative Auto Fuels*, N.Y. Times, Nov. 5, 1989, § 4, at 22 (Editorial Page), col. 1.

56. Key Senators on the Senate Environment and Public Works Committee had introduced their own alternative to the Administration bill on September 15, 1989. Jehl, *Senate Groups Backs New Clean Air Plan With Tougher Control of Auto Emissions*, L.A. Times, Sept. 16, 1989, at A18, col. 1. See also Hager, *Tougher Air-Toxics Standards Get Quick Nod From Panel*, 47 CONG. Q. WEEKLY

The Senate floor fight was bruising. It began with overwhelming votes in favor of strengthening amendments to the ozone layer protection program. Floor consideration was then held in abeyance while key Senate and Administration figures retired to the offices of the Majority Leader for four weeks of grueling negotiations, which ultimately produced an unexpected alliance between Senator Mitchell and President Bush.⁵⁷ Their coalition defeated nearly all contested amendments, and S. 1630 passed the Senate in early April.⁵⁸

In one of the most striking miscalculations of the clean air fight, however, Administration representatives, apparently counting on industry success in weakening the House bill, insisted that the Senate agreement would not be binding through Conference with the House.⁵⁹ As a result, key Senators from the Environment and Public Works Committee were free to pursue the strongest environmental bill possible at Conference.

Renewed House action picked up just as the Senate was finishing its floor consideration.⁶⁰ The full House Energy and Commerce Committee mark up was notable for a series of new agreements, including compromises on the structure of the nonattainment program, the acid rain program, and a new regula-

2783-84 (1989); Hager, *Senate Panel One-Ups Bush on Clean Air Controls*, 47 CONG. Q. WEEKLY 2864-65 (1989); Hager, *Senate Stage is Finally Set for Clean Air Showdown*, 47 CONG. Q. WEEKLY 3145-47 (1989).

57. Shabecoff, *Senators Achieve Accord With Bush on Clean Air Bill*, N.Y. Times, Mar. 2, 1990, at A1, col. 1.

58. Ross, *Battles Loom as Congress Takes Up Clean Air Bill*, L.A. Times, Jan. 22, 1990, at A14, col. 1; Hager, *Loose Ends May Put Brakes on Bill*, 48 CONG. Q. WEEKLY 141 (1990); Hager & Kuntz, *Senate-White House Deal Survives Another Test*, 48 CONG. Q. WEEKLY 900 (1990); Gutfield & Rosewicz, *Battle Over Clean Air Looms in the House As Senate Passes A Bill*, Wall St. J., Apr. 4, 1990, at A1, col. 6.

59. In fact, a front page New York Times story included professions of Administration intention to seek further changes in House consideration of the bill. Shabecoff, *Senators Achieve Accord with Bush on Clean Air Bill*, N.Y. Times, Mar. 1, 1990, at A1, col. 1.

60. Ironically, the House Energy and Commerce Committee reached a compromise nonattainment amendment that was much tougher than an amendment rejected just days earlier on the Senate floor (the Kerry Amendment). The Bush Administration waged an all out campaign against the Kerry Amendment, but did not lobby at all in the Energy and Commerce Committee. See Hager & Kuntz, *supra* note 58. Later, the Conference Committee completely discarded the Senate provision and adopted the House compromise nearly verbatim.

tory system for hazardous air pollutants.⁶¹

In the days before H.R. 3030 reached the House floor, additional agreements were reached on most remaining issues, including reformulation of gasoline, permitting, enforcement, parks protection, and protection of the stratospheric ozone layer. The last issue to be resolved—a program for encouraging the development of alternative fuels—was the subject of last minute negotiations that continued on the floor of the House as the vote was pending, and were successfully concluded only with the direct intervention of the Speaker of the House.⁶²

Compared to the Senate, voting on the House floor was almost anticlimactic. Only one environmental issue—the Sikorski-Green warranty amendment—was actually contested on the floor.⁶³ There were no fierce debates nor razor close votes on environmental amendments.

Although it required enormous effort to report clean air bills from the House and Senate floors, the legislative process was not nearly complete. The stakes in the outcome of the law were so large that even usually noncontroversial matters—such as the appointment of conferees—were intensely contested.⁶⁴ In this high

61. See Shabecoff, *House Drafting Stiff Bill on Urban Air Pollution*, N.Y. Times, Apr. 5, 1990, at D8, col. 3 (discussing nonattainment programs); Shabecoff, *Environment Bill Sent to the House*, N.Y. Times, Apr. 6, 1990, at A18, col. 4 (discussing the acid rain provisions); Ross, *House Panel OKs Stiff Clean Air Bill*, L.A. Times, Apr. 6, 1990, at A4, col. 1; Hager, *Clean Air: War About Over In Both House and Senate*, 48 CONG. Q. WEEKLY 1057-63 (1990).

62. Hager, *House Plans To Act Quickly on Clean Air Amendments*, 48 CONG. Q. WEEKLY 1551-52 (1990); Ross, *House Passes Major Changes to Clean Air Act*, L.A. Times, May 24, 1990, at A1; Hager, *Easy House Vote on Clean Air Bodes Well For Bill's Future*, 48 CONG. Q. WEEKLY 1643-45 (1990).

63. The Sikorski-Green Amendment embodied the emission control warranty compromise discussed earlier. The amendment passed by a 239 to 180 vote. 136 CONG. REC. H2898-902 (daily ed. May 23, 1990). From 1982 to 1990, the House voted on three contested clean air amendments. The first vote was in 1983 and concerned the application of sanctions to areas failing to achieve NAAQS. Environmental forces prevailed by 91 votes. 129 CONG. REC. H3500-18 (daily ed. June 2, 1983). The second vote, in 1987, concerned a deadline extension for attainment of NAAQS. Environmental forces won by a 95 vote margin, despite predictions of an overwhelming industry victory on the vote. See *supra* note 32 and accompanying text. The final vote, in 1990, was on the Sikorski-Green Amendment. The margin of victory here was 59 votes. 136 CONG. REC. H2898-902 (daily ed. May 23, 1990).

64. In the House, the Speaker generally appoints conferees within days of a

pressure climate, the reconciliation of House and Senate positions at conference was especially arduous.⁶⁵

The House and Senate conferees brought different negotiated commitments to the conference. In the House, most conferees were bound through conference on most issues.⁶⁶ But in the Senate, Bush Administration negotiators, expecting a weaker bill to emerge from the House, had insisted that the Senate agreement on S. 1630 be binding only through floor action. The Bush Administration's strategy was to combine the weakest elements of both bills in the final legislation.⁶⁷ This plan backfired. Environmentally minded Senate conferees, freed from their agreement, were able to support House provisions that provided for tougher controls.⁶⁸ The Bush Administration, however, was not given an opportunity to participate in the conference negotiations and push for retention of weakening changes negotiated with the Senate.

All in all, conference was a grueling exercise. Even titles that were extraordinarily similar—like ozone depletion—took weeks to resolve. The process was a continuing series of lengthy closed door negotiations punctuated by public announcements of agreement. As each agreement was reached, it became clear that the factors that produced strong bills in both Houses would continue to be a strong influence.

No one factor was the most important. A decade worth of effort, a change in presidential and congressional leadership, broad congressional support, persistent press coverage, and re-

bills approval. However, the clean air conferees were not named until more than a month after the legislation passed.

65. Although the structures of H.R. 3030 and S. 1630 were quite similar, the strength and scope of the bills' individual titles varied greatly. Hence, various elements of the two bills could be combined to produce legislation either much more stringent or much weaker, than either bill.

66. "Bound through conference" means that the key House conferees, Representatives Waxman (D. Cal.), Dingell (D. Mich.), Lent (R. N.Y.), and Madigan (R. Ill.), had agreed that no changes to the House bill would be accepted unless each conferee agreed. The issues that were not bound through conference were acid rain, chlorofluorocarbons, reformulated gas, and alternative fuels.

67. See e.g., Weiskopf, *Bush Offers Clean Air Compromise*, Wash. Post, Sept. 27, 1990, at A14, col. 1.

68. For instance, the Senate accepted all of title I from the House bill, which was significantly stronger than the Senate version.

newed public interest all played essential roles. As explained in detail in the substantive discussion that follows, the ultimate result is a law that is stronger than either the House or the Senate bills.⁶⁹

IV. MAJOR THEMES OF THE 1990 AMENDMENTS

Despite the wide array of pollution control tacks taken in the effort to address the nation's various air pollution problems, five important themes pervade the control programs in the 1990 Amendments: the very specific and mandatory directives to EPA; the broad availability of citizen lawsuits; the pervasive reliance on technology forcing to achieve the CAA's most important health and environmental protection objectives; reliance, where possible, on market-based pollution control initiatives; and finally, a new emphasis on control of emissions from previously unregulated pollution sources. Each of these themes is discussed in turn below.

A. Specific Mandatory Requirements

To an extent unprecedented in prior environmental statutes, the pollution control programs of the 1990 Amendments include very detailed mandatory directives to EPA, rather than more general mandates or broad grants of authority that would allow for wide latitude in EPA's implementation of the CAA's programs. In addition, statutory deadlines are routinely provided to assure that required actions are taken in a timely fashion. More than two hundred rule-making actions are mandated in the first several years of the 1990 Amendments' implementation.⁷⁰

Examples of this trend abound in each of the CAA's major programs. The air toxics program in title III of the 1990 Amend-

ments includes a specified list of 189 chemicals that are to be regulated as hazardous air pollutants.⁷¹ While the Act previously included a mandate for regulation of hazardous air pollutants, it was left to EPA to assemble the lists. Title III not only establishes the list, but goes on to mandate specific timetables for EPA promulgation of emission standards, and puts in place objective "floors" to limit Agency discretion in setting technology-based standards.⁷²

The acid rain program in title IV is so detailed it actually specifies in the statute the level of emissions permitted at each power plant in the nation. The emission allowances to be allotted to each of the country's large high polluting power plants are provided in a detailed statutory table.⁷³ Emission allowances for other power plants are allotted through detailed formulas provided in the law.⁷⁴ Similarly, title VI of the Amendments lists specific ozone-depleting chemicals and provides a schedule to phase out the production and use of those chemicals.⁷⁵

Title II of the Amendments also provides excellent examples of the emphasis on specificity. The Administration's proposed legislation gave EPA wide latitude to establish emission standards for clean fuel vehicles.⁷⁶ In the final legislation, this administrative discretion is replaced with over ninety specific statutory emission standards for clean fuel vehicles and trucks.⁷⁷ The programs to reformulate fuels also contain numerous specific performance standards and fuel specifications.⁷⁸

The specificity in the 1990 Amendments reflects the concern

71. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(b), 104 Stat. 2399, 2531-35 (codified at 42 U.S.C. § 7412(b) (West Supp. 1991)).

72. *Id.* § 122(c), (d), 104 Stat. at 2537-42 (codified at 42 U.S.C.A. § 7412(c), (d)).

73. *Id.* sec. 401, § 404, 104 Stat. at 2597-601 (codified at 42 U.S.C.A. § 7651(c)(3)).

74. *Id.* § 405, 104 Stat. at 2605-13 (codified at 42 U.S.C.A. § 7651d).

75. *Id.* sec. 602, §§ 602, 604, 605, 104 Stat. at 2650-53, 2655-60 (codified at 42 U.S.C.A. §§ 7671a, 7671c, 7671d).

76. H.R. 3030, 101st Cong., 1st Sess. § 212(b)(1) (1990).

77. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 229, §§ 241-250, 104 Stat. 2399, 2511-29 (codified at 42 U.S.C.A. §§ 7581-7590 (West Supp. 1991)).

78. *Id.* sec. 219, § 211(k), 104 Stat. at 2492-500 (codified at 42 U.S.C.A. § 7545(k)).

69. Pytte, *A Decade's Acrimony Lifted in the Glow of Clean Air*, 48 CONG. Q. WEEKLY 3587-92 (1990); Schneider, *Ambitious Air Pollution Bill Sent to White House*, N.Y. Times, Oct. 28, 1990, at 28, col. 3.

70. See OFFICE OF AIR AND RADIATION, U.S. EPA, IMPLEMENTATION STRATEGY FOR THE CLEAN AIR ACT AMENDMENTS OF 1990, at 17-24 (1991). The sheer length of the 1990 Amendments reflects the level of specificity in the law. By itself, title III of the 1990 Amendments is longer than the entire Clean Air Act Amendments of 1977. In the page proofs passed by the House of Representatives as the final conference report, the 1990 Amendments were more than 700 pages long.

that, without detailed directives, industry intervention might frustrate efforts to put pollution control steps in place. This could happen either directly through EPA inaction, or indirectly through interference with EPA rule-making efforts by White House entities, such as the Office of Management and Budget (OMB) or more recently the White House Council on Competitiveness. History shows that even where EPA seeks to take strong action, the White House will often intervene at industry's behest to block regulatory action.⁷⁹

The effort to control automobile refueling emissions provides an excellent case in point. The Clean Air Act Amendments of 1977 (1977 Amendments) directed EPA to choose between the two available means of controlling refueling emissions: onboard vapor recovery, where a control device is required on the car; or stage II vapor recovery, where control is achieved through a system attached to the gasoline pump.⁸⁰ For thirteen years EPA sought to require onboard vapor recovery under the 1977 Amendments, even formally proposing the requirement at one point in August 1987.⁸¹ The Agency's data showed that onboard canisters are both more effective and less costly than stage II controls.⁸² The OMB, however, intervened repeatedly to prevent EPA from

79. See *Implementation of the Clean Air Act: Hearings Before the Subcomm. on Health and the Environment of the House Comm. on Energy and Commerce*, 102d Cong., 1st Sess. (1991).

80. Clean Air Act Amendments of 1977, Pub. L. No. 95-95, secs. 215, 216, § 202 (a)(5), (6), 91 Stat. 685, 760-61 (codified as amended at 42 U.S.C.A. § 7521(a)(5), (6) (West Supp. 1991)).

81. EPA, Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines; Proposed Rule Making, 52 Fed. Reg. 31,161 (1987) (proposed Aug. 19, 1987).

82. "[E]PA undertook a review and analysis of available information in the late 1970s, and tentatively determined that onboard control for light duty vehicles was technically feasible." EPA, Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines; Proposed Rulemaking, 52 Fed. Reg. 31,161 (1987) (discussing U.S. EPA, Recommendation of Feasibility for Onboard Refueling Loss Control (Feb. 1980) (proposed Aug. 19, 1987). But in April 1981, EPA announced that onboard controls would not be required "in light of serious financial difficulties faced by the automotive industry." *Id.*; see also EPA, Control of Air Pollution from Motor Vehicles and Motor Vehicle Engines, 46 Fed. Reg. 21,629 (Apr. 13, 1981). The cycle was repeated again in the late 1980s. See EPA, Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines; Proposed Rulemaking, 52 Fed. Reg. 31,161, 31,164 (1987) ("EPA believes that the control of gasoline refueling emissions is appropriate, and that onboard controls are feasible and desirable.") (proposed Aug. 19, 1987).

making the finding that onboard controls represent the superior control option.⁸³ Despite the mandate in the 1977 Amendments that EPA require either onboard controls or stage II controls, no final regulatory action was taken.

In contrast, the 1990 Amendments specifically direct EPA to promulgate regulations requiring onboard vapor recovery systems that have a minimum emission control efficiency of ninety-five percent.⁸⁴ EPA must promulgate these regulations within one year.⁸⁵ With the specific mandatory requirements in the 1990 Amendments, and the one year deadline for promulgation of regulations, courts can force EPA to issue regulations that provide the required ninety-five percent control if the EPA fails to take action.⁸⁶ OMB has little leverage, or incentive, to intervene.

This rationale extends broadly across the 1990 Amendments. Given the broad availability of citizen suits, discussed below, courts will be available to assure that Congress's intent is carried forward. However, there are some instances where it was feared that even the threat of lawsuit might not be enough to prompt action. In those cases, various "hammers" relying on other approaches are included.

The requirement that gasoline in polluted areas be reformulated to reduce emissions provides one example. The 1990 Amendments provide that after January 1, 1995, no gasoline can be sold in covered areas of the nation unless it has been certified

83. The White House rejected EPA's August 1987 proposed rule for onboard vapor recovery in January 1989. EPA proposals to include onboard controls in the clean air bill that the Administration was to transmit to Congress in 1989 were also rejected by the White House. See *Clean Air Act Amendments (Parts III): Hearings Before the Subcomm. on Health and the Environment of the House Comm. on Energy and Commerce*, 101st Cong. 1st Sess. 544, 589 (1989).

84. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 202, § 202(a)(6), 104 Stat. 2399, 2473 (codified at 42 U.S.C.A. § 7521(a)(6) (West Supp. 1991)).

85. *Id.* EPA must also require stage II vapor recovery systems in moderate ozone nonattainment areas until the onboard regulations are issued. *Id.*; *id.* sec. 103, § 182(b)(3), 104 Stat. at 2430 (codified at 42 U.S.C.A. § 7511a(b)(3)). In serious, severe, and extreme ozone nonattainment areas, the Administrator may waive the stage II requirement once onboard controls are "in widespread use throughout the vehicle fleet." *Id.* sec. 202, § 202(a)(6), 104 Stat. at 2473 (codified at 42 U.S.C.A. § 7521(a)(6)).

86. Clean Air Act (CAA), § 304(a)(2), 42 U.S.C. § 7604 (1988).

to comply with EPA regulations.⁸⁷ Therefore, it will be in the interest of fuel refiners and suppliers to assure that EPA promulgates these regulations in a timely fashion, so that they can continue to sell fuel.

Another important example is the requirement for EPA issuance of maximum achievable control technology (MACT) regulations for major sources of hazardous air pollutants.⁸⁸ The regulation of hazardous air pollutants is an area where EPA's track record is exceptionally poor, having regulated only seven pollutants in twenty years,⁸⁹ and Congress sought special assurances that regulations would be issued. Such assurances are provided in section 112(j), where states are directed to establish MACT standards of their own in their permits for major sources, if EPA has not issued applicable standards within eighteen months of the rule-making deadline.⁹⁰ Hence, technological steps to control air toxics will be required by the states if EPA fails to issue regulations. The potential for different, and perhaps conflicting, MACT requirements in each state can be expected to prompt industry to work to facilitate, rather than block, timely issuance of national standards. This structure should therefore also help to assure that EPA regulations are promulgated on time.⁹¹

87. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 219, § 211(k)(5), 104 Stat. at 2494-95 (codified at 42 U.S.C.A. § 7545(k)(5)). A covered area is any one of the "9 ozone nonattainment areas having a 1980 population in excess of 250,000 and having the high ozone design value for purposes of this subsection." *Id.* § 112(k)(10)(D), 104 Stat. at 2497 (codified at 42 U.S.C.A. § 7545(k)(10)(D)). These nine areas are likely to be Los Angeles, California; San Diego, California; Philadelphia, Pennsylvania; New York, New York; Milwaukee, Wisconsin; Houston, Texas; Chicago, Illinois; Baltimore, Maryland; and Muskegon, Michigan. J. GUARAS & W. LEWIS, *THE NEW CLEAN AIR ACT* 79-80 (1990). In addition, areas that are redesignated as severe nonattainment areas become "covered areas" one year after their reclassification. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 219, § 112(k)(10)(D), 104 Stat. at 2497 (codified at 42 U.S.C.A. § 7545(k)(10)(D)).

88. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(d), 104 Stat. at 2539-42 (codified at 42 U.S.C.A. § 7412(d)).

89. See *supra* notes 79-83 and accompanying text.

90. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(i), 104 Stat. 2399, 2550-52 (codified at 42 U.S.C.A. § 7412(j) (West Supp. 1991)).

91. The 1990 Amendments provide additional safeguards. If the state fails to require MACT controls in a permit, a citizen can ask EPA to disapprove the permit. *Id.* sec. 501, § 505, 104 Stat. at 2643-45 (codified at 42 U.S.C.A. § 7661(c)(2)). If EPA refuses to disapprove the permit, the citizen can seek judicial review of

B. Availability of Citizen Lawsuits

Virtually all of the Act's numerous regulatory mandates and deadlines for EPA and state action are subject to citizen lawsuits, and can ultimately be compelled by court order.⁹² In addition, citizens can bring lawsuits to enforce specific permit requirements applicable to individual sources.⁹³

In theory, even prior to the 1990 Amendments, the CAA provided an opportunity for citizen suits against private sources. However, this authority was rarely used. One reason is that it has proven difficult for citizens to ascertain the control requirements applicable to a source because these requirements were often buried in complex state implementation plans. Also, even where the requirements were known, it was generally not possible—short of hiring engineers and conducting monitoring—for citizens to determine compliance status.

The 1990 Amendments take a new approach to these problems. Title V of the 1990 Amendments specifies that sources cannot operate without permits.⁹⁴ Each permit must address all CAA requirements applying to the source, and must include monitoring and reporting to provide a record of compliance (or non-compliance) with the CAA's requirements.⁹⁵ The 1990 Amendments also revise CAA section 304(f) to provide that all permit requirements, terms and conditions are to be considered "emis-

EPA's action in federal appellate court. *Id.*

92. CAA § 304(a)(2), 42 U.S.C. § 7604(a)(2) (1988), authorizes citizen suits to compel EPA performance of a nondiscretionary duty. See also Buente, *Citizen Suits and the Clean Air Act Amendments of 1990: Closing the Enforcement Loop*, 21 ENVTL. L. 2233 (1991); Alushin, *Enforcement of the Clean Air Act Amendments of 1990*, 21 ENVTL. L. 2217 (1991).

93. CAA § 304(a)(1), 42 U.S.C. § 7604(a)(1).

94. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 501, § 502, 104 Stat. 2399, 2635-36 (codified at 42 U.S.C.A. § 7661a(a) (West Supp. 1991)).

95. Section 503(b) requires the permit applicant to submit a compliance plan describing how the source will comply with all applicable requirements under the CAA. *Id.* § 503, 104 Stat. at 2641 (codified at 42 U.S.C.A. § 7661b(b)). In addition, § 504(a) requires the permittee to provide monitoring and other information no less often than every six months, as necessary to assure compliance with "applicable requirements of this chapter, including requirements of the applicable implementation plan." *Id.* § 504(a), 104 Stat. at 2642 (codified at 42 U.S.C.A. § 7661c(a)). Finally, § 504(b) and § 504(c) specifically provide for monitoring and reporting requirements. *Id.* § 504(b), (c), 104 Stat. at 2642 (codified at 42 U.S.C.A. § 7661c(b), (c)).

sions standards or limitations," and are therefore subject to citizen lawsuits under section 304(c).⁹⁶

In addition, the 1990 Amendments for the first time explicitly provide that citizens can seek civil fines for both past and current violations of the CAA.⁹⁷ The express authority to seek fines for past violations was a response to the Supreme Court's decision in *Gwaltney of Smithfield Ltd. v. Chesapeake Bay Foundation, Inc.*, which had limited the effectiveness of citizen suits in the Clean Water Act by requiring evidence of ongoing violations.⁹⁸ Other provisions in title VII of the 1990 Amendments provide new authority for citizen challenge in cases where EPA defers performance of a nondiscretionary duty, or unreasonably delays performance of a mandatory duty, even where no statutory deadline is provided.⁹⁹

Taken together, these changes in the CAA endow citizens with unprecedented opportunities to use the courts to compel full implementation of the CAA's provisions. In conjunction with the detailed and mandatory nature of the CAA's directives (discussed above), the citizen suit provisions are intended to assure that the CAA's voluminous provisions are implemented as Congress intended.

C. Technology Forcing to Provide for Health and Environmental Protection

Continuing a trend that began with the original Clean Air Amendments of 1970 (1970 Amendments), and has grown with amendments to the Comprehensive Environmental Response and Liability Act (Superfund)¹⁰⁰ and the Resources Conservation and

96. *Id.* sec. 707(e), § 304(f)(4), 104 Stat. at 2683 (codified at 42 U.S.C.A. § 7604(f)(4)).

97. *Id.* sec. 707(a), § 304(a), 104 Stat. at 2682 (codified at 42 U.S.C.A. § 7604(a)).

98. 484 U.S. 49 (1987). In *Gwaltney*, the Supreme Court held that Clean Water Act § 505, 33 U.S.C. § 1365(a) (1986), only authorized citizen suits to remedy on-going violations. 484 U.S. at 64. The pre-1990 CAA used the same language as the Clean Water Act's citizen suit provision. Compare 33 U.S.C. § 1365(a)(1) with 42 U.S.C. § 7604(a)(1).

99. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 707(f), (h), §§ 304(a), 307(b)(2), 104 Stat. 2399, 2683-84 (codified at 42 U.S.C. §§ 7604(a), 7607(b)(2)).

100. 42 U.S.C. §§ 9601-9675 (1988).

Recovery Act (RCRA),¹⁰¹ the 1990 Amendments include numerous provisions that force the development of new technologies to provide for health protection and to achieve environmental objectives. The rationale behind technology forcing is that by setting emissions standards that are beyond the reach of conventional control methods, Congress creates a market incentive that can force the development and commercialization of new technologies. In the 1970 Amendments, the approach succeeded in spurring development of the catalytic converter for control of automotive tailpipe emissions.¹⁰²

Some of the most prominent examples of technology forcing in the 1990 Amendments are, once again, found in its approach to motor vehicle pollution. The 1990 Amendments call for similar levels of tailpipe emissions reductions to those mandated in the 1970 Amendments, but seek those reductions not from uncontrolled levels, as in the 1970 Amendments, but from vehicles already well controlled. The 1970 Amendments called for a ninety percent reduction in volatile organic compound (VOC) emissions below uncontrolled levels,¹⁰³ and as amended in 1977 a seventy-five percent reduction in NO_x emissions below uncontrolled levels.¹⁰⁴ The clean-fuel program in the 1990 Amendments calls for a further eighty percent reduction in NO_x and VOC emissions.¹⁰⁵ In past years, the burden of reducing vehicle pollution

101. 42 U.S.C. §§ 6901-6992k (1988).

102. For a discussion of the success of the 1970 motor vehicle standards in forcing the development of pollution control technology see ENVIRONMENTAL LAW INST., LAW OF ENVIRONMENTAL PROTECTION § 11.06 (1987).

103. Clean Air Amendments of 1970, Pub. L. No. 91-604, sec. 6(a), § 202(b)(1)(A), 84 Stat. 1676, 1690, amended by Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 201, § 202(a)(3), 104 Stat. at 2472 (codified at 42 U.S.C.A. § 7521(a)(3)).

104. Clean Air Act Amendments of 1977, Pub. L. No. 95-95, sec. 224(a), § 202(a)(3)(A)(ii), 91 Stat. 685, 765-67 (codified at 42 U.S.C. § 7521(a)(3)(A)(ii) (1988)), amended by Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 201, § 202(a)(3)(A)(ii), 104 Stat. 2399, 2472 (codified at 42 U.S.C.A. § 7521(a)(3)(A)(ii) (West Supp. 1991)).

105. Compare 40 C.F.R. § 86.090-8 (1990) (model year 1990 light-duty vehicles must meet hydrocarbon standard of 0.41 grams per mile and NO_x standards of 1.0 grams per mile) with Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 229, §§ 243(a), 249, 104 Stat. 2399, 2514-19, 2525-28 (codified at 42 U.S.C.A. §§ 7558, 7589 (West Supp. 1991)) (model year 2001 light-duty vehicles must meet nonmethane organic gas standard of 0.075 grams per mile and NO_x standard of 0.2 grams per mile). See generally Waxman, Weststone & Barnett, *Cars,*

has rested entirely with auto makers, and fuel suppliers have had little if any incentive to develop lower polluting motor vehicle fuels. Under the 1990 Amendments, fuel providers are for the first time also subject to technology forcing. The newly enacted section 211(k), one of the most important provisions added in the 1990 Amendments, mandates the development and sale of reformulated gasoline in all seriously polluted areas.¹⁰⁶ Reformulated gasoline must be capable of reducing both toxic and smog-forming emissions from all vehicles by fifteen percent by 1995, and twenty-five percent by the year 2000.¹⁰⁷

Another extremely important example of technology forcing is the requirement for urban areas to make specified annual increments of progress toward achievement of ambient air quality standards. All areas in violation of the ozone standard are required to reduce ozone precursor emissions by fifteen percent over the CAA's first five years regardless of costs, and extreme areas are required to continue to reduce three percent per year thereafter.¹⁰⁸

Fuels and Clean Air: A Review of Title II of the Clean Air Act Amendments of 1990. 21 ENVTL. L. 1947, 1963-64 (1991).

106. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 219, § 211(k), 104 Stat. 2399, 2492-97 (codified at 42 U.S.C.A. § 7545(k)(1) (West Supp. 1991)).

107. *Id.* § 211(k)(3)(B), 104 Stat. at 2493-94 (codified at 42 U.S.C.A. § 7545(k)(3)(B)). The 1990 Amendments require a 25% reduction from reformulated gasoline in the year 2000. EPA can adjust the reduction to 20%, if it finds that a 25% reduction is infeasible. Conversely, if EPA finds that a greater than 25% reduction is technologically feasible, it must require that level of reduction. *Id.* EPA has determined that the reformulated gasoline provisions will provide for some of the most cost-effective emission reductions available in heavily polluted areas. See South Coast Federal Implementation Plan, 55 Fed. Reg. 36,548 (1990).

108. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 182, 104 Stat. at 2428-30 (codified at 42 U.S.C.A. § 7511a(b)-(d)). Marginal areas are required to attain NAAQS within three years. *Id.* § 182(a) tab. 1, 104 Stat. at 2428 (codified at 42 U.S.C.A. § 7511(a) tab. 1). Serious, severe, and extreme areas must continue to reduce emissions at three percent per year after the initial five-year interval. Limited exceptions are available to serious and severe areas that have imposed all control measures in use in the next most stringent nonattainment classification. *Id.* § 182(c)(2)(B), (d), (e), 104 Stat. at 2432, 2436-37, 2438 (codified at 42 U.S.C.A. §§ 7511a(c)(2)(B), (d), (e)). For a further discussion of nonattainment schedules, see *infra* notes 135-207 and accompanying text; see also Waxman, Weststone & Barnett, *A Roadmap to Title I of the Clean Air Act Amendments of 1990: Bringing Blue Skies Back to America's Cities*, 21 ENVTL. L. 1843 (1991).

The original Administration clean air proposal would have exempted nonat-

Other examples of technology forcing include provisions mandating the phase-out of ozone-depleting chemicals in title VI of the 1990 Amendments.¹⁰⁹ provisions requiring controls on toxic sources to reduce residual risks as necessary to protect the public health with an ample margin of safety,¹¹⁰ provisions requiring the reformulation of consumer products, such as paints, coatings, and solvents, to make them less polluting,¹¹¹ and provisions mandating the development of controls for small sources of air toxics known as "area sources."¹¹²

The breadth of technology forcing in the 1990 Amendments reflects a conclusion that the nature and severity of the air pollution problems addressed in the CAA are so daunting that immediately available technologies are not, in themselves, sufficient to assure protection of America's public health and environmental resources.¹¹³ In fact, in the case of ozone depletion, new technologies must be developed for protection of the planet itself.¹¹⁴ Congress's willingness to rely on technology forcing was bolstered by its experience with the early CAA, which demonstrated that the concept works not only to create economical new emissions controls, but also to provide a competitive edge to American compa-

tainment areas from requirements for achievement of additional emission reductions, if such reductions were found to be too costly, or otherwise not feasible. H.R. 3030, 101st Cong., 1st Sess. § 182(c)(1)(B) (1989). This approach was rejected in favor of the mandatory reduction requirements described above.

109. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 602, §§ 604, 605, 104 Stat. at 2655-60 (codified at 42 U.S.C.A. §§ 7671c, 7671d).

110. *Id.* sec. 301, § 112(f), 104 Stat. at 2543-45 (codified at 42 U.S.C.A. § 7412(f)(2)(A)).

111. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 183(e), 104 Stat. 2399, 2444-47 (codified at 42 U.S.C.A. § 7511b(e) (West Supp. 1991)).

112. *Id.* sec. 301, § 112(c)(3), 104 Stat. at 2537 (codified at 42 U.S.C.A. § 7412(c)(3)). An area source is "any stationary source of hazardous air pollutants that is not a major source." *Id.* § 112(a)(2), 104 Stat. at 2531 (codified at 42 U.S.C.A. § 7412(a)(2)).

113. "We estimate that after all [immediately available] controls are applied, nonattainment cities still fall about 1.2 to 3.1 million tons per year short of the [VOC] emissions reductions needed to attain the standard . . . or about 11% to 27% of 1985 emissions." OFFICE OF TECHNOLOGY ASSESSMENT, CATCHING OUR BREATH: NEXT STEPS FOR REDUCING URBAN OZONE 139 (1989). This report provides an excellent general discussion of the difficulties of controlling urban ozone.

114. See U.N. Environment Programme, *Effects of Changes in Stratospheric Ozone and Global Climate*, Vol. 2: Stratospheric Ozone (Oct. 1986); U.N. Environment Programme, *Environmental Effects Panel Report* (Nov. 1989).

nies in a global economy where nations are increasingly concerned about environmental protection.

D. Reliance on Market-Based Control Strategies

Another important theme in the 1990 Amendments is the use of market-based control strategies. The acid rain program in title IV relies upon an innovative new program of marketable emission allowances to achieve SO₂ emission reductions.¹¹⁵ This is the most widely noted market-based regime in the legislation. However, there are several other examples. A marketable permit system will be used to implement the phase-out program for ozone-depleting chemicals in title VI.¹¹⁶ Also, numerous elements of title I seek to use market approaches to achieve emission reductions. Examples include emission fees for severe ozone nonattainment areas failing to attain by the deadline,¹¹⁷ required economic incentive programs for areas failing to meet ozone pollution control milestones,¹¹⁸ and specific authorization for use of economic incentives such as emission fees or auctions of emission rights in state air quality plans.¹¹⁹

Market-based approaches were judged to be suitable where they are accompanied by an aggressive tracking system to assure that the expected emission reductions are achieved. In addition, Congress concluded that economic-based systems are appropriate only in cases where the program objective is to assure a specified level of aggregate emission reductions. In such cases, localized impacts, which might result from a concentration of emissions in areas where pollution controls are expensive, are not a concern.

For example, the program to achieve a reduction in acid rain

115. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 401, §§ 401-416, 104 Stat. at 2584-631 (codified at 42 U.S.C.A. § 7651-7651o). See also Fichtborn, *Command-and-Control vs. the Market: The Potential Effects of Other Clean Air Act Requirements on Acid Rain Compliance*, 21 ENVTL. L. 2069 (1991). Parker, Paling & Moore, *Clean Air Allowance Trading*, 21 ENVTL. L. 2021 (1991).

116. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 602, §§ 604, 605, 104 Stat. 2399, 2655-60 (codified at 42 U.S.C.A. §§ 7671c, 7671d (West Supp. 1991)).

117. *Id.* sec. 103, § 185, 104 Stat. at 2450-51 (codified at 42 U.S.C.A. § 7511d).

118. *Id.* § 182(g)(4), 104 Stat. at 2441 (codified at 42 U.S.C.A. § 7511a(g)(4)).

119. *Id.* sec. 102, § 172(c)(6), 104 Stat. at 2414 (codified at 42 U.S.C.A. § 7502(c)(6)).

emissions (which seeks an aggregate forty-percent reduction in SO₂ emissions) and the program for the phase out of chlorofluorocarbons (CFCs) and other ozone-depleting chemicals (which mandates an aggregate phase-down schedule) address problems that are regional or global in nature, and are therefore amenable to market-based solutions. In contrast, the program to attain ambient air quality standards and the program to control hazardous air pollutants are much less suitable for a market approach. In those instances, high localized concentrations, which might result from a market-oriented structure, would present serious public health risks.¹²⁰

E. Control of Unregulated Sources

Another important feature of the 1990 Amendments is a new emphasis on the control of previously unregulated pollution sources. The original 1970 Amendments focused primarily on large facilities, such as power plants, manufacturing operations, and chemical production facilities. Stationary source requirements applied for the most part only to "major sources" that emit 100 tons per year or more of regulated pollutants.¹²¹

Unfortunately, however, the nation's pollution problems have proven far too intractable to be effectively addressed exclusively through controls aimed at these very visible targets. Recent studies have confirmed that largely unregulated pollution sources, such as gas stations, dry cleaners, and consumer solvents, present an important and growing part of both the ozone air pollution and air toxic problems.¹²²

120. Market-based approaches will, in theory, only produce emission reductions in those areas where reductions are least expensive. Hence, areas where pollution concentrations have reached unsafe levels would not be addressed except in situations where reductions are especially cost-effective.

121. For example, CAA § 172(b)(6), 42 U.S.C. § 7502 (1988), amended by Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 102(b), § 172(b), 104 Stat. 2399, 2413-14 (codified at 42 U.S.C.A. § 7502(b) (West Supp. 1991)), required permits only for "major sources." A "major source" only included sources emitting 100 or more tons per year of any pollutant. 42 U.S.C. § 7602(j).

122. See generally OFFICE OF TECHNOLOGY ASSESSMENT, *supra* note 113, at 113-22 (characterizing the sources of VOC emissions). For a discussion of the contribution of small areas sources to the air toxic problem, see U.S. EPA, *CANCER RISKS FROM OUTDOOR EXPOSURES TO AIR TOXICS* (1988). Reductions from previously unregulated sources are often very cost-effective because the least expensive

The 1990 Amendments include several programs that will for the first time focus on these unregulated pollution sources. To control ozone air pollution, the 1990 Amendments create a graduated system in which increasingly smaller sources are regulated in more polluted areas. The current 100 ton per year definition of "major source" is retained in marginal and moderate ozone nonattainment areas, but the cut-off is lowered to fifty tons per year in serious ozone nonattainment areas,¹²³ twenty-five tons per year in severe areas,¹²⁴ and ten tons per year in extreme areas.¹²⁵ Major sources in each affected area are subjected to the full regime of the CAA's stationary source pollution control requirements, as well as to the CAA's permit provisions and emission fees.¹²⁶

In addition, the 1990 Amendments establish a sweeping new program that will for the first time require consumer and commercial products (such as paints, solvents, and coatings) to be reformulated to reduce emissions.¹²⁷ Studies have found that two of the most important consumer and commercial product emissions sources, solvent evaporation and surface coatings, are together responsible for more than thirty percent of urban hydrocarbon emissions, a share that is projected to increase in future years in the absence of new regulation.¹²⁸ The 1990 Amendments require that products that together are responsible for eighty percent of the aggregate emissions from this sector be reformulated to reduce emissions.¹²⁹ The air toxics control program also includes

control options from this segment of the inventory are still available.

123. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 182(c), 104 Stat. at 2431 (codified at 42 U.S.C.A. § 7511a(c)).

124. *Id.* § 182(d), 104 Stat. at 2436-37 (codified at 42 U.S.C.A. § 7511a(d)).

125. *Id.* § 182(e), 104 Stat. at 2438 (codified at 42 U.S.C.A. § 7511(e)).

126. Major sources are subject to the new source review provisions such as the LAER technology requirement, 42 U.S.C. § 7503(2) (1988), offsets requirements, Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 102(c)(10), § 172(c), 104 Stat. 2399, 2416 (codified at 42 U.S.C.A. § 7503(c) (West Supp. 1991)), RACT requirements, *id.* sec. 102(a), § 172(c)(1), 104 Stat. at 2414 (codified at 42 U.S.C.A. § 7502(c)(1)), and the permit requirements of title V, including requirements for emission fees, *id.* sec. 501, § 502, 104 Stat. at 2635-36 (codified at 42 U.S.C.A. § 7661a).

127. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 183(e), 104 Stat. at 2444-46, 42 U.S.C.A. § 7511b(e).

128. OFFICE OF TECHNOLOGY ASSESSMENT, *supra* note 113, at 129.

129. These products must be reformulated to reflect use of the "best available controls" to reduce emissions. Clean Air Act Amendments of 1990, Pub. L. No.

new requirements for control of small sources.¹³⁰ EPA has estimated that area sources, those emission sources too small to be counted as major sources, are responsible for fully twenty-five percent of the nation's air toxic cancer risks.¹³¹ This level of risk is comparable to the risk estimated to result from all major sources combined.¹³² In section 112(c)(3) of the 1990 Amendments, EPA is directed to regulate source categories representing ninety percent of the aggregate emissions of the thirty most important area source pollutants.¹³³

By including programs to address this important part of the emission inventories for air toxics and VOCs, Congress has sought to assure that the health and environmental protection objectives of the CAA will be achieved. Additionally, the inclusion of these less conventional regulatory targets in the CAA responds to concerns that large industrial sources were being targeted to an unfair extent. Finally, the 1990 Amendments demonstrate that all aspects of our air pollution problems can be meaningfully addressed without mandating unrealistic, draconian, or politically infeasible changes in the way America lives and works.

V. THE 1990 AMENDMENTS: A TITLE-BY-TITLE OVERVIEW

A. *Title I: Attainment of Ambient Air Quality Standards, Stationary Source Controls*

Title I revises the stationary source controls designed to achieve national ambient air quality standards (NAAQS). While the 1990 Amendments include many important changes that apply to all ambient air quality standards, the most noteworthy provisions in title I are the detailed new programs for coping with the three prevalent ambient air pollution problems: ozone, carbon monoxide (CO), and small particulate matter (PM-10).¹³⁴ These

101-549, sec. 103, § 183(e)(3)(A), 104 Stat. 2399, 2445-56 (codified at 42 U.S.C.A. § 7511b(e)(3)(A) (West Supp. 1991)).

130. *Id.* sec. 301, § 112(c)(3), 104 Stat. at 2537 (codified at 42 U.S.C.A. § 7412(c)(3)).

131. U.S. EPA, CANCER RISKS FROM OUTDOOR EXPOSURES TO AIR TOXICS (1988).

132. *Id.*

133. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(c)(3), 104 Stat. at 2537 (codified at 42 U.S.C.A. § 7512(c)(3)).

134. The programs are included in Clean Air Act Amendments of 1990, Pub.

programs are discussed below after a brief review of the structure of the CAA program for achieving ambient air quality standards.

1. *Ambient Air Quality Standards and the Structure of the Clean Air Act*

Section 110 of the 1970 Amendments requires all areas of the country to meet NAAQS, which are established by EPA at a level considered adequate to protect public health.¹³⁵ These standards are the cornerstone of the CAA's pollution control programs. Each ambient standard is based on a detailed review of scientific information, called a criteria document, prepared by EPA and expert advisors.¹³⁶

Achievement of the health standards is a driving force behind many of the pollution control requirements of the CAA. States are given primary responsibility for attaining the standards. Each is required under CAA section 110 to prepare a state implementation plan (SIP) that specifies enforceable pollution control requirements sufficient to attain the standard.¹³⁷ Although several of these standards have been achieved throughout the nation,¹³⁸ the health standards for either ozone, PM-10, CO, or some combination of these pollutants, are currently exceeded in almost every major American urban area.¹³⁹

Areas not meeting the CAA's standards are termed nonattainment areas, and are subject to additional control requirements in part D of the CAA. The nonattainment program includes tougher control requirements for new sources, which must

L. No. 101-549, secs. 103, 104, 105(a), §§ 181-190, 104 Stat. 2399, 2423-62 (codified at 42 U.S.C.A. §§ 7511-7513(b) (West Supp. 1991)).

135. CAA § 109(b)(1), 42 U.S.C. § 7409(b)(1) (1988).

136. CAA § 109, 42 U.S.C. § 7409.

137. CAA § 110(a)(2) outlines in detail the required elements of each SIP. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 101(b), § 110(a)(2), 104 Stat. at 2404-06 (codified at 42 U.S.C.A. § 7410(a)(2)).

138. The NAAQS for nitrogen dioxide, SO₂, and lead have been attained in almost all areas of the nation. See U.S. EPA, NATIONAL AIR QUALITY AND EMISSION TRENDS REPORT 1989 (1991).

139. *Id.* For a thorough discussion of the nonattainment problem, see *Clean Air Act Standards: Hearing Before the Subcomm. on Health and the Environment of the House Comm. on Energy and Commerce*, 101st Cong., 1st Sess. (1989) [hereinafter *Clean Air Act Standards*].

achieve the lowest achievable emission rate (LAER),¹⁴⁰ and must "offset" new emissions they create with reductions from other sources.¹⁴¹ In addition, existing sources in nonattainment areas—those sources too old to be covered by the CAA's new source performance standards under section 111—are required to use all reasonably available control technology (RACT).¹⁴² EPA issues guidelines for specific industry categories, called Control Technique Guidance (CTG), to define what technologies should be considered reasonably available.¹⁴³

Congress amended the CAA in 1977 and 1988 to extend the CAA's original 1980 attainment deadlines from 1980 to August 31, 1988.¹⁴⁴ Unfortunately, however, rapid growth in aggregate vehicle miles traveled outpaced gains from the 1970 motor vehicle tailpipe standards,¹⁴⁵ and regulatory paralysis at EPA left the states with little help in the extremely difficult task of reducing pollution in the face of population and economic growth.¹⁴⁶ State air quality implementation plans were, in almost every instance, proven inadequate to the task.¹⁴⁷ In fact, ozone pollution levels

140. CAA § 172(2), 42 U.S.C. § 7502(2) (1988).

141. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 102(c)(10), § 173, 104 Stat. 2399, 2416 (codified at 42 U.S.C.A. § 7503(c) (West Supp. 1991)).

142. *Id.* § 172(c)(1), 104 Stat. at 2414 (codified at 42 U.S.C.A. § 7502(c)(1)).

143. EPA halted the issuance of new CTGs in 1984. The Agency had issued 22 CTGs prior to that time. See J. QUARLES & W. LEWIS, *supra* note 87, at 81-82 (listing all completed and pending CTGs).

144. Actually, the pre-1990 CAA only allowed areas until December 31, 1987. CAA § 172(a)(2), 42 U.S.C. 7502 (1988), amended by Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 102(b), § 172(a)(2), 104 Stat. at 2413 (codified at 42 U.S.C.A. § 7502(a)(2)). However, in November of 1987 an amendment to appropriations legislation eliminated funding for enforcement of nonattainment sanctions for eight additional months, making the effective deadline August 31, 1988. See *supra* note 31-32 and accompanying text.

145. See OFFICE OF TECHNOLOGY ASSESSMENT, *supra* note 113, at 34-35. Also complicating the effort was a trend toward production of higher polluting gasoline. See SAFER, Proposal for Reformulated Gasoline Amendments to the Clean Air Act (Feb. 23, 1990).

146. Examples of regulatory paralysis include 13 years of failure to control gasoline refueling emissions, a complete cessation in EPA's issuance of CTGs to help states implement RACT requirements under § 172, EPA's failure to tighten tailpipe standards for trucks and buses, and EPA's opposition to congressional proposals to tighten emission standards for light and heavy vehicles.

147. More than 90 cities remained in violation of the ozone NAAQS. See *Clean Air Act Standards*, *supra* note 139, at 30.

continued to increase in many areas.¹⁴⁸

The 1990 Amendments address the widespread nonattainment problem in a number of ways. These include providing strong federal guidance, mandating a shift to cleaner-burning reformulated gasoline, establishing numerous new motor vehicle emission control requirements, providing for control of smaller pollution sources, establishing a graduated regime of control requirements subjecting more polluted areas to more stringent measures, and requiring states to demonstrate incremental progress toward achievement of the standard by the applicable deadline. Each of these initiatives is discussed below.

2. *Ozone Air Pollution*

Of the three nonattainment problems, ozone pollution is by far the most serious and pervasive. In 1988, more than 100 million Americans lived in areas where pollution levels exceeded those acceptable for health protection.¹⁴⁹ High ozone levels can cause lung dysfunction, coughing, wheezing, shortness of breath, nausea, respiratory infection, and in some cases, permanent scarring of the lung tissue.¹⁵⁰ Young children, the elderly, and those with asthma, emphysema, and other respiratory ailments are the most vulnerable.¹⁵¹

The 1990 Amendments establish an aggressive new program for control of ozone air pollution. The program focuses on the two central ozone precursors, VOCs and NO_x. These pollutants combine in the atmosphere in the presence of sunlight to form ozone.

a. *Graduated Control Program*

Each of the nation's 100 ozone nonattainment areas is placed in one of five categories, according to the severity of its ozone pol-

148. *Id.* Twenty-eight new cities were added to EPA's list of ozone nonattainment areas in 1989. Many areas experienced the highest ozone levels they had ever recorded in the summer of 1988. *Id.*

149. *Id.*

150. *Id.* See also U.S. EPA, Summary of Selected New Information on Effects of Ozone on Health and Vegetation (Nov. 1988); Congressional Research Service, Health Benefits of Air Pollution Control: A Discussion (Feb. 1989).

151. *Clean Air Act Standards*, *supra* note 139, at 82-83 (statement of Thomas Godar, Director, Pulmonary Disease Section, St. Francis Hospital).

lution problem.¹⁵² Control regimes are established for each category, so that more polluted areas are required to take more and stronger measures to reduce VOC and NO_x emissions, but are given more time to attain the standard.

For example, marginal areas, the least polluted of the ozone nonattainment areas, have just three years to attain the ozone standard,¹⁵³ and are subject to only two new requirements: an updated permit program, and regular reporting of emission inventories.¹⁵⁴

By contrast, the most polluted areas, termed extreme areas, are allotted twenty years to attain the standard,¹⁵⁵ but must implement a long list of control measures. In addition to implementing the marginal area requirements, extreme areas must submit new attainment demonstrations; achieve at least a three percent reduction in VOC emissions annually; regulate as a major source any stationary source with emissions greater than ten tons per year; require greater offsetting of emissions from new or modified sources; mandate that all utility, industrial, and commercial boilers use advanced controls or clean fuels to reduce NO_x pollution; require stage II vapor recovery at gasoline service stations to control vehicle refueling emissions; take more aggressive transportation control planning steps; direct large employers to establish ride-sharing programs; adopt enhanced automotive inspection and maintenance programs; require centrally-fueled fleets to purchase clean fuel vehicles; require that all gasoline sold in the area be reformulated to reduce emissions; and prohibit the use of "netting," a concept that allows modifications of pollution sources to escape additional control requirements.¹⁵⁶

The control requirements for areas falling between the two extremes include a subset of the requirements applying to extreme areas, or in some cases, less rigorous versions of extreme

152. *Clean Air Act Amendments of 1990*, Pub. L. No. 101-549, sec. 103, § 181(a), 104 Stat. 2399, 2423 (codified at 42 U.S.C.A. § 7512(a)(1) (West Supp. 1991)).

153. *Id.* § 181(a), 104 Stat. at 2423 (codified at 42 U.S.C.A. § 7511(a) tab. 1).

154. *Id.* § 182(a), 104 Stat. at 2428-29 (codified at 42 U.S.C.A. § 7511a(a)).

155. *Id.* § 181(a), 104 Stat. at 2423 (codified at 42 U.S.C.A. § 7511(a) tab. 1).

156. *Id.* § 182(e), 104 Stat. at 2438-39 (codified at 42 U.S.C.A. § 7511a(e)) (incorporating the requirements for marginal, moderate, serious, and severe areas).

area requirements. Attainment deadlines for moderate, serious, and severe areas fall similarly between these examples.¹⁵⁷

b. *Milestones and Sanctions*

Prior to the 1990 Amendments, the CAA simply mandated that areas make pollution reductions sufficient to achieve "reasonable further progress" toward attainment of the standards.¹⁵⁸ The new ozone program instead establishes very specific minimum levels of emission reductions that each area must achieve.

Under the graduated control program, all moderate, serious, severe, and extreme nonattainment areas are required to achieve at least a fifteen percent reduction in VOC emissions over the first six years following enactment. After the initial reduction, serious, severe, and extreme areas must achieve further VOC emission reductions of three percent per year until the standard is attained.¹⁵⁹ Greater VOC emission reductions are required as

157. The ozone nonattainment categories are marginal, moderate, serious, severe, and extreme. Areas in each of these categories are required to attain as expeditiously as possible, but no later than 3, 6, 9, 15, and 20 years, respectively. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 181(a), 104 Stat. 2399, 2423 (codified at 42 U.S.C.A. § 7511(a) (West Supp. 1991)).

158. CAA § 172(b)(3), 42 U.S.C. § 7402 (1988), amended by Clean Air Act Amendments of 1990, Pub. L. No. 101-549, 104 Stat. at 2412-15 (codified at 42 U.S.C.A. § 7502). The term "reasonable further progress" was defined in § 171 to mean "annual incremental reductions in emissions" of a particular pollutant, sufficient to provide for attainment of the applicable NAAQS by the deadline set forth in § 172(a), 42 U.S.C. § 7501(a), amended by Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 102(a), 104 Stat. at 2412 (codified at 42 U.S.C.A. § 7501(1)). Unfortunately, however, the widespread nonattainment problem gives clear evidence that the term has not been interpreted in practice to require reductions sufficient to attain the NAAQS by the deadline.

159. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 182(b)(1), 104 Stat. at 2428-29 (codified at 42 U.S.C.A. § 7511a(b)(1)) (establishing the 15% reduction requirement); *id.* § 182(c)(2)(B), 104 Stat. at 2432 (codified at 42 U.S.C.A. § 7511a(c)(2)(B)) (establishing the three percent annual reduction requirement). Serious and severe areas are authorized to reduce by an amount less than the required three percent per year if they can demonstrate that their air quality plan includes each control measure in use in the next most stringent category. *Id.* Extreme areas are provided no authority to achieve less than three percent per year. *Id.* § 182(e), 104 Stat. at 2438 (codified at 42 U.S.C.A. § 7511a(e)).

This structure is intended to assure that new emissions control technologies are developed and used throughout the nation. Los Angeles, the nation's one extreme area, must develop new technologies to continue to achieve the required

needed to attain the standard by the applicable deadline. In addition, reductions in NO_x are mandated if they will help to lower ozone levels.¹⁶⁰

Section 182(g) establishes a milestone system. Under this system, six years after the enactment of the 1990 Amendments, and each following third year, serious, severe, and extreme areas must demonstrate that they are meeting their emission reduction requirements, and are therefore on track toward attaining the standard by the applicable deadline.¹⁶¹ This system is intended to assure that areas falling behind in their efforts to achieve the standard by the applicable deadline take early corrective action. It contrasts sharply with the approach used in implementing the pre-1990 CAA attainment deadlines, where areas were not informed of their likely failure to meet deadlines until it was too late for corrective action. Under the 1990 Amendments, areas that do not meet their milestones are subject to sanctions under section 179¹⁶² and must promptly submit plan revisions that make up for the emission reduction shortfall, and put the areas back on track toward meeting the deadline.¹⁶³

3. *Nitrogen Oxides Control*

Past efforts to achieve the ozone standard have focused almost exclusively on the control of VOC pollution, and made little effort to reduce emissions of NO_x, the other major ozone precursor.¹⁶⁴ However, it is now apparent that NO_x control is essential

three percent per year reduction in emissions. These technologies, along with other aggressive control steps already in place in Los Angeles, must then be used in any severe area seeking approval for a program that fails to achieve a three percent annual reduction. Control steps adopted in any severe area must, in turn, be adopted in serious areas seeking authorization for achieving less than the three percent reduction. Aggressive control measures adopted in Los Angeles will therefore filter down to be used as needed in other polluted areas throughout the nation.

160. *Id.* § 182(f), 104 Stat. at 2439-40 (codified at 42 U.S.C.A. § 7511a(f)).

161. *Id.* § 182(g)(1), 104 Stat. at 2441 (codified at 42 U.S.C.A. § 7511a(g)(1)).

162. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 102, § 179, 104 Stat. 2399, 2420-23 (codified at 42 U.S.C.A. § 7509 (West Supp. 1991)).

163. *Id.* sec. 103, § 182(g), 104 Stat. at 2441 (codified at 42 U.S.C.A. § 7511a(g)(3)). Rather than submit a plan, the state can elect to have the area reclassified to the next higher level of nonattainment area, or to adopt an economic incentive program. *Id.*

164. For example, the pre-1990 CAA new source review requirements in ozone

to reduction of ozone pollution levels in many parts of the country, including the southeast, the northeast, and southern California.¹⁶⁵ The 1990 Amendments therefore abandon the VOC-only strategy and establish a presumption that all VOC control requirements apply to emissions of NO_x as well.¹⁶⁶

Specifically, CAA section 182(f) provides that all state plan provisions governing major stationary sources of VOCs under the ozone nonattainment subpart also apply to major stationary sources of NO_x, unless the Administrator determines that NO_x reductions will not contribute to attainment of the ozone standard, or finds that net air quality benefits would be greater in the absence of NO_x control.¹⁶⁷ As a result of this provision, a broad range of requirements established in subpart 2 will apply to major NO_x sources under this provision. These include requirements for installation of RACT at existing sources,¹⁶⁸ requirements for use of LAER technology at new and modified facilities,¹⁶⁹ requirements for higher new and modified source offset ratios,¹⁷⁰ limitations on netting,¹⁷¹ requirements for control of smaller sources in

nonattainment areas applied only to major sources of VOCs. 40 C.F.R. §§ 51.165(a)(1)(iv)(B), 51.165(a)(2) (1990).

165. COMMITTEE ON ENERGY AND COMMERCE, CLEAN AIR ACT AMENDMENTS OF 1990, H.R. REP. NO. 490, 101st Cong., 1st Sess. 203-04 (1990) [hereinafter H.R. REP. NO. 490]. See *Air Quality Standards In Southern California: Hearing Before the Subcomm. on Health and the Environment of the Comm. on Energy and Commerce*, 100th Cong., 1st Sess. 7 (1987) (testimony of James Lentz, South Coast Air Quality Management District); Chameides, Lindsay, Richardson & Kiang, *The Role of Biogenic Hydrocarbons in Urban Photochemical Smog: Atlanta as a Case Study*, 241 SCIENCE 1743 (1988).

166. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 182(f), 104 Stat. at 2439-40 (codified at 42 U.S.C.A. § 7511a(f)).

167. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 182(f), 104 Stat. 2399, 2439-40 (codified at 42 U.S.C.A. § 7511a(f) (West Supp. 1991)).

168. *Id.* sec. 102(b), § 172, 104 Stat. at 2414 (codified at 42 U.S.C.A. § 7502(c)(1)).

169. CAA § 173, 42 U.S.C. § 7502(2) (1988).

170. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 102(c)(10), § 173(c), 104 Stat. at 2416 (codified at 42 U.S.C.A. § 7503(c)). In addition, higher offset ratios are required in serious areas, *id.* sec. 103, § 182(c), 104 Stat. at 2436 (codified at 42 U.S.C.A. § 7511a(c)(10)), severe areas, *id.* § 182(d)(2), 104 Stat. at 2437 (codified at 42 U.S.C.A. § 7511a(d)(2)), and extreme areas, *id.* § 182(e)(1), 104 Stat. at 2438 (codified at 42 U.S.C.A. § 7511a(e)(1)).

171. *Id.* § 182(c)(6), 104 Stat. at 2435 (codified at 42 U.S.C.A. § 7511a(c)(6)) (governing serious and severe areas); *id.* § 182(e)(2), 104 Stat. at 2438 (codified at

more polluted areas,¹⁷² emission fees,¹⁷³ requirements applying to ozone transport regions,¹⁷⁴ and permit requirements.¹⁷⁵

4. *Federal Control Measures*

The 1990 Amendments also put in place an important federal program intended to provide expertise and guidance, and also to address important emissions sources that are, for the most part, beyond effective state control. These provisions require EPA to establish new control techniques guidance documents to help states evaluate technologies available for control of ozone precursor emissions from stationary sources.¹⁷⁶ EPA must also update existing CTGs,¹⁷⁷ establish standards to control emissions from loading and unloading of marine tank vessels,¹⁷⁸ and establish a new program for control of emissions from consumer and commercial products.¹⁷⁹

The consumer product program is the most important of the new federal control programs in title I. Section 183(e) puts EPA on a schedule for the regulation of "consumer and commercial products,"¹⁸⁰ which constitute a large segment of the emission in-

42 U.S.C.A. § 7511a(e)(2)) (governing extreme areas).

172. *Id.* § 182(c), 104 Stat. at 2431 (codified at 42 U.S.C.A. § 7511a(c)) (establishing the 50 ton cut off for serious ozone nonattainment areas); *id.* § 182(d), 104 Stat. at 2436-37 (codified at 42 U.S.C.A. § 7511a(d)) (establishing the 25 ton cut off for severe ozone nonattainment areas); *id.* § 182(e), 104 Stat. at 2438 (codified at 42 U.S.C.A. § 7511a(e)) (establishing the 10 ton cut off for extreme ozone nonattainment areas).

173. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 185, 104 Stat. 2399, 2450-51 (codified at 42 U.S.C.A. § 7511d (West Supp. 1991)) (establishing a fee on all sources in severe areas that fail to attain NAAQS); *id.* sec. 501, § 502(b)(3), 104 Stat. at 2636 (codified at 42 U.S.C.A. § 7661a(b)(3)) (establishing fee under the general permit program).

174. *Id.* sec. 103, § 184, 104 Stat. at 2448-50 (codified at 42 U.S.C.A. § 7511(c)).

175. *Id.* sec. 501, §§ 501-507, 104 Stat. at 2635-48 (codified at 42 U.S.C.A. § 7661-7661D).

176. *Id.* sec. 103, § 183(a), 104 Stat. at 2443 (codified at 42 U.S.C.A. § 7511b(a)).

177. *Id.* § 183(b), 104 Stat. at 2443-44 (codified at 42 U.S.C.A. § 7511b(b)).

178. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103 § 183(f), 104 Stat. 2399, 2447-48 (codified at 42 U.S.C.A. § 7511b(f) (West Supp. 1991)).

179. *Id.* § 183(e), 104 Stat. at 2444-47 (codified at 42 U.S.C.A. § 7511b(e)).

180. *Id.* § 183(e)(3), 104 Stat. at 2445-46 (codified at 42 U.S.C.A.

ventory that was entirely unregulated prior to the 1990 Amendments.¹⁸¹ The term is broadly defined to include any product that releases VOC emissions.¹⁸² Examples of products subject to regulation under this provision include paints, solvents, pesticides, cleaners, degreasers, and even deodorants and hair sprays. Under an eleven-year schedule, EPA must list and regulate the products responsible for at least eighty percent of the VOC emissions attributable to all consumer and commercial products.¹⁸³ The regulations must require emission reductions achievable with use of the "best available controls," a term defined to include chemical reformulation, product or feedstock substitution, repackaging, and directions for use.¹⁸⁴

5. Interstate Ozone Transport Regions

The 1990 Amendments provide a new program to deal with the interstate movement of ozone pollution. This program is intended to grapple with large-scale regional ozone pollution problems resulting from combined emissions over a broad area. The most prominent regional ozone problem is in the northeast and mid-Atlantic states, where high pollution levels have been monitored frequently over broad areas, including remote rural areas such as Acadia National Park off the coast of Maine.¹⁸⁵

The 1990 Amendments specifically establish the Northeast Ozone Transport Region, stretching from Washington, D.C. to Maine. In addition, the 1990 Amendments set forth a mechanism

§ 7511(b)(3).

181. The Congressional Office of Technology Assessment has estimated that together the two most important types of commercial and consumer products, organic solvents and surface coatings, will be responsible for more than 30% of VOC emissions in nonattainment areas by 1994. OFFICE OF TECHNOLOGY ASSESSMENT, *supra* note 113, at 129.

182. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 183(e)(1)(B), 104 Stat. 2399, 2445 (codified at 42 U.S.C.A. § 7511(b)(1)(B) (West Supp. 1991)). The definition does explicitly exempt motor vehicles and fuels regulated under title II. *Id.*

183. *Id.* § 183(e)(2)-(3), 104 Stat. at 2445-46 (codified at 42 U.S.C.A. § 7511a(e)(2)-(3)).

184. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 183(e)(1)(A), 104 Stat. 2399, 2444 (codified at 42 U.S.C.A. § 7511a(e)(1)(A) (West Supp. 1991)).

185. See *Clean Air Act Standards*, *supra* note 139, at 237 (testimony of John Elston, on behalf of the Northeast States for Coordinated Air Use Management).

through which other transport regions can be created.¹⁸⁶

New control requirements are established for the Northeast Ozone Transport Region (and any subsequently established ozone transport region), applying to both attainment and nonattainment areas within the region. Cities with a population of 100,000 or more are required to adopt enhanced motor vehicle inspection and maintenance programs and apply RACT to all VOC sources subject to a control technique guideline.¹⁸⁷ In addition, either stage II vapor recovery, or another control measure capable of achieving comparable emission reductions, must be implemented by each state in the transport region.¹⁸⁸

Finally, within the ozone transport region any stationary source with the potential to emit fifty or more tons of VOCs per year must be regulated in the same manner as a major source in a moderate ozone nonattainment area.¹⁸⁹ These VOC requirements will apply to major sources of NO_x as well, in the absence of a finding under section 182(f) that control of NO_x will not contribute to lower ozone levels, or produce a net air quality benefit.¹⁹⁰

186. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 184(a), 104 Stat. at 2448 (codified at 42 U.S.C.A. § 7511(c)(a)). This is the only interstate transport region specifically established in the legislation. Other transport regions may be established by EPA on its own motion or upon petition by a state. *Id.* sec. 102(f)(1), § 176A(e), 104 Stat. at 2419 (codified at 42 U.S.C.A. § 7506a(a)).

187. *Id.* sec. 103, § 184(b)(1), 104 Stat. at 2449 (codified at 42 U.S.C.A. § 7511(c)(b)(1)).

188. *Id.* § 184(b)(2), 104 Stat. at 2449 (codified at 42 U.S.C.A. § 7511(c)(b)(2)).

189. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 184(b)(2), 104 Stat. 2399, 2449 (codified at 42 U.S.C.A. § 7511(c)(b)(2) (West Supp. 1991)). Requirements for moderate ozone nonattainment areas are provided in part in *id.* § 182(b), 104 Stat. at 2428-31 (codified at 42 U.S.C.A. § 7511a(b)). Other applicable part D requirements include requirements of *id.* sec. 102(b)-(c), §§ 172, 173, 104 Stat. at 2412-17 (codified at 42 U.S.C.A. §§ 7502, 7503). Existing major sources in ozone transport regions are, therefore, required to install RACT. *Id.* sec. 102(b), 103, §§ 172(c)(1), 182(b)(2), 104 Stat. at 2414 (codified at 42 U.S.C.A. §§ 7502(c)(1), 7511a(b)(2)). New 50 ton or larger sources must install LAER technology and secure offsets at a 1.15 to 1 ratio. *Id.* sec. 103, § 182(b)(5), 104 Stat. at 2431 (codified at 42 U.S.C.A. § 7511a(b)(5)); 42 U.S.C. § 7508(2) (1988)).

190. An ozone transport region can, on its own motion, propose additional control requirements for the region by a vote of the majority of member states. EPA must, within nine months, determine whether to adopt the suggested controls, providing an explanation for any proposal that is not adopted. EPA must recommend equal or more effective emission control alternatives to rejected con-

*B. The Program for Carbon Monoxide and
Small Particulate Matter*

Title I also includes graduated programs for areas failing to attain the NAAQS for CO and PM-10.¹⁹¹ These pollutants also present serious national health risks. In fact, EPA's most recent evaluation of data indicates that some twenty-five million Americans now live in areas that violate the PM-10 standard,¹⁹² while almost thirty million reside in areas that violate the CO standard.¹⁹³

1. Carbon Monoxide

Carbon monoxide nonattainment areas are divided into two classes: moderate and serious.¹⁹⁴ Moderate areas are required to attain the standard by 1996, while serious areas have until 2001.¹⁹⁵

The control requirements applied to CO nonattainment areas reflect the predominant contribution of motor vehicle emissions to CO pollution levels.¹⁹⁶ They include transportation control programs,¹⁹⁷ vehicle inspection and maintenance programs,¹⁹⁸ use of oxygenated gasoline,¹⁹⁹ and for more polluted areas, a milestone

control strategies developed by an ozone transport region. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 184(c), 104 Stat. at 2449-50 (codified at 42 U.S.C.A. § 7511(c)).

191. *Id.* secs. 104, 105(a), §§ 186, 187, 104 Stat. at 2452-63 (codified at 42 U.S.C.A. §§ 7512-7513b).

192. H.R. Rep. No. 490, *supra* note 165, at 207.

193. *Id.* at 204.

194. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 104, § 186(a), 104 Stat. 2399, 2453-54 (codified at 42 U.S.C.A. § 7512 (West Supp. 1991)).

195. *Id.*

196. In 1987, transportation sources produced 70% of CO emissions nationwide. Walsh, *Global Trends in Motor Vehicle Use and Emissions*, 15 ANN. REV. ENERGY 217, 218 (1990).

197. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 104, § 187(a)(2), (b)(2), 104 Stat. at 2454, 2456 (codified at 42 U.S.C.A. § 7512a(a)(2), (b)(2)).

198. *Id.* § 187(a)(6), 104 Stat. at 2455 (codified at 42 U.S.C.A. § 7512a(a)(6)).

199. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, secs. 104, 219, §§ 187(b)(3), 211(m), 104 Stat. 2399, 2456, 2498-500 (codified at 42 U.S.C.A. §§ 7512a(b)(3), 7545(m) (West Supp. 1991)).

program requiring specific annual emission reductions.²⁰⁰

2. Small Particulate Matter

All PM-10 nonattainment areas are initially categorized as moderate, and required to attain the NAAQS by 1995.²⁰¹ However, EPA has authority to reclassify areas as serious, and extend the attainment deadline until not later than January 1, 2002.²⁰²

Moderate areas must impose "reasonably available control measures" on all sources of PM-10,²⁰³ while serious areas must require the "best available control measures."²⁰⁴ These technology requirements apply to both direct sources of PM-10 and to sources of PM-10 precursors.²⁰⁵ Emissions of SO₂ and NO_x, which

200. *Id.* § 187(a)(7), 104 Stat. at 2455 (codified at 42 U.S.C.A. § 7512a(a)(7)).
201. *Id.* sec. 105(a), § 188(a), 104 Stat. at 2458 (codified at 42 U.S.C.A. § 7513(a)).

202. *Id.* § 188(b), 104 Stat. at 2458-59 (codified at 42 U.S.C.A. § 7513(b)) (governing reclassification); *id.* § 188(c), 104 Stat. at 2459 (codified at 42 U.S.C.A. § 7513(c)) (establishing the attainment dates). Moderate areas can obtain two one-year extensions if the state has complied with the applicable implementation plan, the PM-10 standard has not been exceeded more than once in the past year, and the annual average concentration of PM-10 is equal to or less than the standard. *Id.* § 188(d), 104 Stat. at 2459-60 (codified at 42 U.S.C.A. § 7513(d)). Serious areas can also obtain extensions if they meet stringent requirements, including proof that they have complied with their implementation plans, that they are using the most stringent measures available, and that attainment would be impracticable. In addition, the state must submit a revised plan that will provide attainment "by the most expeditious alternative date feasible." *Id.* § 188(e), 104 Stat. at 2460 (codified at 42 U.S.C.A. § 7513(e)). Finally, the requirements of the PM-10 program can be waived if EPA determines that anthropogenic sources of PM-10 are not the major cause of nonattainment. *Id.* § 188(f), 104 Stat. at 2460 (codified at 42 U.S.C.A. § 7513(f)).

203. *Id.* § 189(a)(1)(C), 104 Stat. at 2460-61 (codified at 42 U.S.C.A. § 7513a(a)(1)(C)).

204. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 105, § 189(b)(1)(B), 104 Stat. 2399, 2461 (codified at 42 U.S.C.A. § 7513a(b)(1)(B) (West Supp. 1991)).

205. *Id.* § 189(e), 104 Stat. at 2462 (codified at 42 U.S.C.A. § 7513a(e)). Section 189(e) states that the application of control requirements for PM-10 also apply to major stationary sources of PM-10 precursors. However, this control technology is only required in areas where EPA determines that "such sources do not contribute significantly to PM-10 levels which exceed the standard in the area." *Id.* EPA is authorized under this section to exclude precursor sources from control requirements in situations where the problem is due almost entirely to other sources, such as nonanthropogenic, wind-blown dust.

transform in the atmosphere into sulfates and nitrate particles, are especially important PM-10 precursors. Hence, existing major SO₂ and NO_x sources in serious PM-10 nonattainment areas will be required to impose the best available control measures.²⁰⁶ In addition, EPA is directed to issue guidance on controls available for important source categories of PM-10 pollution, including urban fugitive dust, residential wood burning, and agricultural burning.²⁰⁷

C. Title II: Regulation of Motor Vehicles and Fuels

Title II of the 1990 Amendments contains provisions that reduce pollution from cars, trucks, and other mobile sources. These provisions are essential to an effective clean air bill because motor vehicles play a dominant role in air pollution.

Mobile sources are the single largest source of air pollution in the country. They produce sixty-seven percent of the nation's CO emissions, fifty percent of the nation's VOC emissions, and forty-five percent of the nation's NO_x emissions.²⁰⁸ They also cause half of the cancer attributed to toxic emissions.²⁰⁹ The 1970 Amendments recognized the importance of automobiles as a pollution source. As amended in 1977, the CAA mandated a ninety percent reduction in emissions of hydrocarbon and CO from passenger cars, and a seventy-five percent reduction in NO_x emissions.²¹⁰ Unfortunately, much of the "per vehicle" benefits of these stan-

206. This provision will probably require the use of flue gas scrubbers for SO₂ control and selective catalytic reduction for control of NO_x.

207. *Id.* § 190, 104 Stat. at 2462 (codified at 42 U.S.C.A. § 7513b).

208. Walsh, *supra* note 196, at 218. In the most heavily polluted areas of the nation these percentages are even higher. In the Northeast, motor vehicles emit 61% of the VOCs, and 53% of the NO_x. *Clean Air Act Amendments (Part I): Hearings Before the Subcomm. on Health and the Environment of the House Comm. on Energy and Commerce*, 101st Cong., 1st Sess. 331 (1989) (testimony of Bruce Mallett on behalf of the Northeast States for Coordinated Air Use Management). In Los Angeles, mobile sources emit 52% of the VOCs, 76% of the NO_x, and 96% of the CO. California Air Resources Bd., California's Mobile Source Plan (Dec. 1990).

209. H. R. Rep. No. 490, *supra* note 165, at 277.

210. CAA § 202(a)(3)(A)(ii), 42 U.S.C. § 7521(a)(3)(ii) (1988), amended by Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 201, § 202(a)(3)(A)(ii), 104 Stat. 2399, 2472 (codified at 42 U.S.C.A. § 7521(a)(3)(A)(ii) (West Supp. 1991)).

dards have been offset by constantly increasing vehicle use²¹¹ and deterioration in the quality of gasoline.²¹²

The 1990 Amendments comprehensively revise the federal motor vehicle control program. There are four basic elements to the revisions in the motor vehicle control program: tighter controls on conventional vehicles; requirements to clean up gasoline and diesel fuels; new programs to promote special "clean-fuel" vehicles; and a first-time program to control emissions from nonroad vehicles such as trains, ships, and construction equipment.

1. Tighter Controls on Conventional Vehicles

The provisions to control emissions from conventional vehicles have several important components. First, they tighten tailpipe standards on passenger cars, light-duty trucks, and heavy-duty trucks. In the case of passenger cars and the lightest light-duty trucks, tier I standards that go into effect in the mid-1990s cut hydrocarbon emissions by thirty-five percent from today's levels and NO_x emissions by sixty percent.²¹³ A second round of standards—the tier II standards—go into effect in 2003 and require an additional fifty-percent reduction in emissions. If EPA finds that the tier II standards are unnecessary, infeasible, or not cost-effective, it can prevent their implementation.²¹⁴

Second, the 1990 Amendments require control of evaporative emissions of gasoline, and mandate recapture of refueling emissions.²¹⁵ On hot summer days that are especially conducive to ozone formation, evaporative and refueling emissions can dwarf exhaust emissions of hydrocarbons.²¹⁶ Unfortunately, they had

211. Total vehicle miles traveled increased by 69% between 1970 and 1988. COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS, CLEAN AIR ACT AMENDMENTS OF 1989, S. Rep. No. 228, 101st Cong. 1st Sess. 85 (1989).

212. Waxman, Wetsstone & Barnett, *supra* note 105, at 1956-58.

213. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, secs. 203, 204, § 202(g), (j), 104 Stat. at 2474, 2479 (codified at 42 U.S.C.A. § 7521(g), (j)).

214. *Id.* sec. 203, § 202(i), 104 Stat. at 2476-79 (codified at 42 U.S.C.A. § 7521(i)).

215. *Id.* sec. 205, § 202(k), 104 Stat. at 2480 (codified at 42 U.S.C.A. § 7521(k)) (controlling evaporative emissions); *id.* sec. 202, § 202(a)(6), 104 Stat. at 2473 (codified at 42 U.S.C.A. § 7521(a)(6)) (controlling refueling emissions).

216. S. Rep. No. 228, *supra* note 211, 94-96.

been largely neglected by the pre-1990 CAA.

Third, the 1990 Amendments require better "in-use" performance by motor vehicles. The 1990 Amendments double the durability requirements for emission controls on cars from five years or fifty thousand miles to ten years or one hundred thousand miles.²¹⁷ They also require the installation of "onboard diagnostics" that indicate when emission controls are not operating properly, and must be fixed by vehicle owners.²¹⁸

Finally, the 1990 Amendments establish for the first time a program to control emissions of toxic pollutants from motor vehicles.²¹⁹

2. Clean-Fuel Requirements

While the 1970 CAA required that motor vehicles become cleaner, it left motor vehicle fuels largely unregulated. The result was that gasoline became dirtier, wiping out much of the benefit of cleaner vehicles.²²⁰ The 1990 Amendments reverse this trend. They establish programs to reduce fuel volatility,²²¹ desulfurize diesel fuel,²²² add cleansing detergents to gasoline,²²³ and complete the phase-out of leaded gasoline.²²⁴

Most important, the 1990 Amendments contain special programs for ozone and CO nonattainment areas. In the nine worst ozone nonattainment areas, the Amendments require that gasoline be reformulated to be fifteen percent cleaner by 1995 and

twenty-five percent cleaner by 2000.²²⁵ Other ozone nonattainment areas may opt in to the reformulated gasoline program.²²⁶

In CO nonattainment areas, the 1990 Amendments require that all gasoline be oxygenated during the four-month (or longer) period identified by EPA as the time when CO levels peak²²⁷—normally this is in the wintertime. Adding oxygenates improves combustion efficiency, thereby cutting CO emissions from the typical vehicle by ten percent to twenty percent.²²⁸

3. Clean-Fuel Vehicles

While cleaner gasoline will immediately reduce emissions from existing vehicles, and tighter controls on new vehicles will continue the downward trend in "per vehicle" emissions, ultimately, these measures are not likely to prove sufficient in the most polluted areas.

In order to attain the ozone NAAQS, our most heavily polluted cities, such as Los Angeles, New York, Chicago, and Houston, need to reduce citywide VOC and NO_x emissions by fifty to eighty percent—and keep emissions there while accommodating future economic growth.²²⁹

The 1990 Amendments recognize that a new generation of super-clean vehicles is needed in the most heavily polluted cities if we are to provide a long term solution to our smog problems. New "clean-fuel" emission standards, too stringent to be met by conventional vehicles and fuels, are established to assure the development of such low polluting vehicles.²³⁰ Clean vehicles meet-

217. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 210, § 207(c)(5), 104 Stat. 2399, 2486 (codified at 42 U.S.C.A. § 7541(c)(5) (West Supp. 1991)).

218. *Id.*, sec. 207, § 202(m), 104 Stat. at 2481-83 (codified at 42 U.S.C.A. § 7521(m)).

219. *Id.*, sec. 206, § 202(i), 104 Stat. at 2481 (codified at 42 U.S.C.A. § 7521(i)).

220. SAFER, *supra* note 145.

221. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 216, § 211(h), 104 Stat. at 2489-90 (codified at 42 U.S.C.A. § 7545(h)).

222. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 217, § 211(i), 104 Stat. 2399, 2490-91 (codified at 42 U.S.C.A. § 7545(i) (West Supp. 1991)).

223. *Id.*, sec. 219, § 211(k)(3)(A)(iv), (i), 104 Stat. at 2493, 2497-98 (codified at 42 U.S.C.A. § 7545(k)(3)(A)(iv), (i)).

224. *Id.*, sec. 220, § 211(n), 104 Stat. at 2500 (codified at 42 U.S.C.A. § 7545(n)).

225. *Id.*, sec. 219, § 211(k)(3)(B)(i), 104 Stat. at 2493 (codified at 42 U.S.C.A. § 7545(k)(3)(B)(i)).

226. *Id.*, § 211(k)(6), 104 Stat. at 2495 (codified at 42 U.S.C.A. § 7545(k)(6)).

227. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 219, § 211(m)(2), 104 Stat. 2399, 2498-99 (codified at 42 U.S.C.A. § 7545(m)(2) (West Supp. 1991)).

228. U.S. EPA, Guidance on Estimating Motor Vehicle Emission Reductions (Jan. 29, 1988).

229. U.S. EPA, Ozone Nonattainment Analysis: A Comparison of Bills (Jan. 1990).

230. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 229, § 243, 104 Stat. at 2514-19 (codified at 42 U.S.C.A. § 7583). These requirements are part of the new subpart C of CAA title II. *Id.*, sec. 229, §§ 241-250, 104 Stat. at 2511-26 (codified at 42 U.S.C.A. §§ 7581-7590).

ing these standards must be used in commercial fleets in over two dozen cities.²³¹ In addition, in California, which has the nation's worst air pollution, the 1990 Amendments require automobile makers to sell hundreds of thousands of clean-fuel vehicles to the general public and require fuel companies to provide clean alternative fuels for these vehicles.²³²

4. *Control of Nonroad Vehicles*

The final program in title II directs EPA to study and then establish controls on emissions from nonroad vehicles.²³³ The program reflects the emphasis in the 1990 Amendments on regulating uncontrolled sources.²³⁴ While the pre-1990 CAA extensively regulated internal combustion engines in cars and trucks, the pre-1990 CAA overlooked internal combustion engines in other applications, such as construction equipment, trains, or ships.²³⁵ The 1990 Amendments require EPA to establish controls for important classes of nonroad vehicles that require the same degree of control as the regulations for comparable on-road vehicles.²³⁶

D. *Title III: Control of Hazardous Air Pollutants*

The release of hazardous air pollutants is a problem of surprising magnitude. Industry data indicate that 2.7 billion pounds of hazardous air pollution were released into the nation's air sup-

231. See *id.* § 246(1)-(2), 104 Stat. at 2520-21 (codified at 42 U.S.C.A. § 7586(1)-(2)). Section 246(1) requires the use of clean-fuel vehicles in commercial fleets in any covered area. Section 246(2) defines a covered area to include: severe, serious, and extreme ozone nonattainment areas with populations greater than 250,000 and CO nonattainment areas with particularly severe pollution or a population of 250,000.

232. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 229, § 249, 104 Stat. 2389, 2525-28 (codified at 42 U.S.C.A. § 7589 (West Supp. 1991)).

233. *Id.* sec. 222(a), § 213, 104 Stat. at 2500-02 (codified at 42 U.S.C.A. § 7547).

234. See *supra* notes 123-125 and accompanying text.

235. Nonroad vehicles are important emission sources. For example, in Los Angeles they produce roughly 20% of the NO_x, 4% of the VOCs, and 6% of the CO. California Air Resources Board, *supra* note 208, at 23-25.

236. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 222(a), § 213(a)(3)-(4), 104 Stat. at 2500-01 (codified at 42 U.S.C.A. § 7547(a)(3)-(4)). In addition, newly enacted § 218 prohibits the production of nonroad vehicles that use leaded gasoline. *Id.* sec. 226, § 218, 104 Stat. at 2505 (codified at 42 U.S.C.A. § 7553).

ply in the year 1987 alone.²³⁷ EPA has estimated that these industrial emissions, combined with emissions of hazardous air pollutants from other sources, such as cars and trucks, cause some 1,600 to 3,000 cancer cases a year.²³⁸ In addition, EPA data indicate that industrial facilities are often associated with extremely high cancer risks.²³⁹ Toxic emissions can also cause birth defects, neurological injury, and genetic mutations.²⁴⁰

Section 112 of the 1970 CAA provided authority for control of hazardous air pollutants.²⁴¹ That provision was intended to achieve stringent, uniform, and relatively quick federal regulation of substances that pose risks of serious illness at relatively low concentrations. EPA was directed under section 112 to list and within one year of listing, regulate air pollutants that are hazard-

237. OFFICE OF TOXIC SUBSTANCES, *supra* note 28, at 18-19.

238. H.R. REP. NO. 490, *supra* note 165, at 277.

239. Many facilities are associated with lifetime cancer risks of greater than 1 in 100. One facility, a Texaco Oil Company facility in Port Neches, Texas, has been associated with a lifetime cancer risk to the most exposed individual of greater than 1 in 10. Subcommittee on Health and the Environment, The EPA Preliminary List of High Risk Industrial Facilities (May 1989). See also Letter from William Reilly, Administrator, U.S. EPA, to Representative Henry A. Waxman, Chairman, Health and Environment Subcommittee (May 26, 1990); *High Risks of Cancer Found at 205 Plant Sites*, L.A. Times, June 9, 1989, at A1, col. 2. In a separate study of risks associated with coke oven emissions, EPA identified an additional 26 facilities associated with a lifetime cancer risk of greater than 1 in 1000 to the most exposed individual, including six facilities associated with a greater than 1 in 100 cancer risk. See Letter from William K. Reilly, Administrator, U.S. EPA, to Representative Henry A. Waxman, Chairman, Health and Environment Subcommittee (June 21, 1989); see also Subcommittee on Health and Environment, U.S. House of Representatives, The National Toxic Release Inventory: Preliminary Air Toxic Data (Mar. 22, 1989).

240. There have been no quantitative assessments of the noncancerous risks created by toxic emissions. In 1987, however, EPA ranked qualitatively the noncancerous risks created by over 30 environmental problems within the Agency's jurisdiction. Toxic emissions ranked as the second greatest threat to human health, exceeded only by the health risks attributable to ozone and other "criteria" air pollutants. U.S. EPA, UNFINISHED BUSINESS: A COMPARATIVE ASSESSMENT OF ENVIRONMENTAL PROBLEMS 42 (1987).

241. 42 U.S.C. § 7412 (1988), amended by Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112, 104 Stat. 2399, 2431-574 (codified at 42 U.S.C.A. § 7412 (West Supp. 1991)). Pollutants controlled under this section tend to be less widespread than those regulated under § 109 NAAQSs, but are associated with more serious health impacts, such as cancer, neurological disorders, and reproductive dysfunctions.

ous to human health.²⁴² Substances that might cause cancer, reproductive disorders, neurological effects, or other serious ailments were expected to be regulated under this section.

Unfortunately, however, EPA proved unwilling or unable to mount an effective regulatory program in its twenty-year effort to implement section 112.²⁴³ Prior to enactment of the 1990 Amendments, only eight chemicals were listed as hazardous,²⁴⁴ and only seven were regulated under section 112.²⁴⁵ Of the fifty toxic substances emitted by industry in the greatest volume in 1987, only one—benzene—has been regulated even partially by EPA.²⁴⁶

As a result of EPA's inaction, industrial sources have had little incentive to regulate toxic emissions. Among the industrial sources reporting toxic emissions under the right-to-know provisions of the Superfund Amendments and Reauthorization Act of 1986, less than thirty percent reported using any emission controls.²⁴⁷

Title III of the 1990 Amendments revises section 112 to establish an aggressive new program for the regulation of hazardous air pollution. Specific programs are established for the control of major source and area source emissions, the regulation of emissions from incinerators of all types, the control of chemical acci-

242. CAA § 112(b), 42 U.S.C. § 7412, amended by Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(b), 104 Stat. at 2532-37 (codified at 42 U.S.C.A. § 7412(b)).

243. As a legal matter, it has been possible for hazardous air pollutants to remain unregulated because EPA declined to formally list the vast majority of dangerous substances as hazardous. EPA was not required to establish standards unless the substance was listed. Examples of unlisted compounds include: chloroform, formaldehyde, PCBs, carbon tetrachloride and acrylonitrile. All of these substances have, for many years, been formally designated as carcinogens by the National Toxicology Program of the U.S. Public Health Service. See Public Health Service, U.S. Dept. of Health and Human Services, Third Annual Report on Carcinogens (Sept. 1983).

EPA has also failed to list a number of clearly dangerous chemicals that are not carcinogens. Examples include methyl isocyanate (the gas which killed 2000 at Bhopal) and phosgene (which was used as a nerve gas in World War I).

244. The list included: beryllium, mercury, vinyl chloride, asbestos, benzene, radionuclides, arsenic, and coke oven emissions. 40 C.F.R. § 61.01 (1990).

245. No standard for coke oven emissions has been issued.

246. H.R. Rep. No. 490, *supra* note 165, at 322.

247. Letter from EPA Office of Pesticides and Toxic Substances to House Health and Environment Subcommittee (July 1989).

dents, and the protection of the Great Lakes, the Chesapeake Bay, and coastal waters.

The 1990 Amendments establish a statutory list of 189 substances that are designated hazardous air pollutants.²⁴⁸ By statutorily designating the hazardous air pollutants, Congress bypassed the listing process that proved in past years to be a major obstacle to regulatory action.²⁴⁹ Under the 1990 Amendments, EPA must produce a list of all categories of major sources and area sources of each listed pollutant,²⁵⁰ promulgate standards requiring installation of MACT at all new and existing major sources,²⁵¹ and establish "residual risk" standards requiring more than MACT when necessary to protect the public health with an ample margin of safety.²⁵²

1. Maximum Achievable Control Technology Standards

The cornerstone of the new hazardous air pollution control regime is the program mandating use of Maximum Achievable Control Technology (MACT) to reduce emissions. Under new section 112(d), major sources are to be subject to standards requiring the maximum degree of emission reduction that is deemed achievable.²⁵³ These standards are to be established by source category for all categories that release hazardous air pollutants. In

248. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(b), 104 Stat. 2399, 2532-35 (codified at 42 U.S.C.A. § 7412(b) (West Supp. 1991)).

249. See *supra* note 243.

250. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(c), 104 Stat. at 2537 (codified at 42 U.S.C.A. § 7412(c)). An area source is "any stationary source of hazardous pollutants that is not a major source," an automobile, or a nonroad vehicle. *Id.* § 112(a)(2), 104 Stat. at 2531 (codified at 42 U.S.C.A. § 7412(a)(2)). A major source is any stationary source that can emit 10 tons per year of any individual hazardous air pollutant, or 25 tons per year of any combination of hazardous pollutants. *Id.* § 112(a)(1), 104 Stat. at 2531 (codified at 42 U.S.C.A. § 7412(a)(1)).

251. *Id.* § 112(d), 104 Stat. at 2539-42 (codified at 42 U.S.C.A. § 7412(d)). Section 112(e) sets forth the schedule for promulgating the standards. *Id.* § 112(e), 104 Stat. at 2542-43 (codified at 42 U.S.C.A. § 7412(e)).

252. *Id.* § 112(f)(2), 104 Stat. at 2543-44 (codified at 42 U.S.C.A. § 7412(f)(2)).

253. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(d)(2), 104 Stat. 2399, 2539 (codified at 42 U.S.C.A. § 7412(d)(2) (West Supp. 1991)).

cases where a source emits more than one hazardous air pollutant, EPA regulations are to require the maximum degree of emission reduction for each pollutant.²⁵⁴

Concerned that EPA might not be able to withstand industry pressure in establishing MACT standards, Congress prescribed the minimum stringency of the MACT standards. For new sources, section 112(d) standards are specifically required to be no less stringent than the level of emission control "achieved in practice by the best controlled similar source."²⁵⁵ Existing source MACT standards may be less stringent than those applicable to new sources, but are required to be no less stringent than the average emission limit achieved by the best performing twelve per cent of the similar sources.²⁵⁶

254. This point is made explicitly in the statement of conferees accompanying the Joint House-Senate Conference Report, *Clean Air Act Amendments of 1990*, CONFERENCE REPORT TO ACCOMPANY S. 1630, H.R. CONF. REP. NO. 952, 101st Cong., 2d Sess. 338 (1990). Title III's facility-by-facility approach, in contrast to the chemical-by-chemical approach, requires consideration of all pollutants.

255. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(d)(3), 104 Stat. at 2540 (codified at 42 U.S.C.A. § 7412(d)(3)). The best controlled similar source is the source in a particular category or subcategory with the lowest emission rate.

256. *Id.* If the source category has fewer than 30 sources, the minimum control technology for existing sources cannot be lower than that used by the best performing five sources in the category. *Id.* § 112(d)(3)(B), 104 Stat. at 2540 (codified at 42 U.S.C.A. § 7412(d)(3)(B)). In some instances, there may be no source in the category or subcategory with a level of control as stringent as MACT. In this situation, § 112(d)(3) provides that the Administrator may establish MACT standards without regard to the performance of similar sources. However, under no circumstances may the Administrator set a MACT standard for new sources that is less stringent than the controls achieved in practice by the best controlled similar source. Similarly, the Administrator cannot set a MACT standard for existing sources that is less stringent than the average achieved by the best controlled 12% of existing similar sources—or for smaller source categories the five best performing similar sources.

An important provision in § 112(d)(3) excludes certain tightly controlled sources from the calculation of the minimum stringency of existing source MACT standards. In determining which are the best performing sources under § 112(d)(3), the Administrator is not required to consider sources that have, 18 months before proposal of an emission standard or 30 months before promulgation of a final emission standard, first achieved the LAER as required by § 171. *Id.* § 112(d)(3)(A), 104 Stat. at 2540 (codified at 42 U.S.C.A. § 7412(d)(3)(A)). This exclusion is intended to provide EPA with discretion to conclude that, at times of rapid growth, where large numbers of new facilities are present, existing sources will not necessarily be required to meet a MACT standard reflecting

Because the stringency of MACT standards under section 112(d) is tied to the performance of other sources in the same category or subcategory, the categorization of sources is extremely important. Industry interests are likely to advocate establishment of a long list of narrow categories where, on the basis of limited differences, more stringently controlled sources can be separated from heavily polluting facilities. This approach would lead to far less stringent standards for more heavily polluting facilities, and tougher standards for facilities that are already better controlled. Those sources that are already clean would be penalized under such a reading, and requirements for the uncontrolled sources, where tight restrictions are most sorely needed, would be relaxed. This was not Congress's intent, as evidenced by section 112(c)(1), which specifically directs that categories and subcategories established in the hazardous air pollutant program are to be consistent with the list of source categories established pursuant to the regulation of new sources under section 111 and part C.²⁵⁷

LAER technologies required on new sources. Of course, since § 112(d)(3) establishes only a minimum stringency for the existing source MACT standards, EPA retains authority to establish more stringent standards, including those that do take LAER technologies into consideration. If new source LAER technologies are amenable for use in reducing existing source emissions, it is expected that EPA would take them into consideration. In fact, § 112(d)(3) specifically authorizes the Administrator to go beyond the floor if a more stringent standard is achievable. *Id.* ("Emission standards promulgated under this subsection for existing sources in a category or subcategory . . . may be more stringent than" that achieved by the best performing 12% of similar sources.); see also 136 CONG. REC. S16,980 (daily ed. Oct. 27, 1990) (remarks of Senator Durenberger) ("The fundamental test is not whether the standard is at or above the average for the best performing 12 percent of the sources in the category, but whether the standard reflects the maximum degree in reduction of emissions that is achievable."). In any case, over time, the minimum stringency of MACT standards will increase as the 18 month LAER exclusion periods lapse and LAER sources are brought into the calculation. In addition, the continual tightening of existing source standards will be assured under § 112(d)(6), which provides that all MACT standards are to be reviewed every eight years, and revised as necessary to take into account "developments in practices, processes, and control technologies." Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(d)(6), 104 Stat. at 2540 (codified at 42 U.S.C.A. § 7412(d)(6)).

257. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(c)(1), 104 Stat. at 2537 (codified at 42 U.S.C.A. § 7412(c)(1)). Section 112(c)(1) reflects a congressional determination that EPA should, to the extent possible, rely on the broad industrial categories used in under the pre-1990 CAA, rather than on a new much longer list of narrow categories and subcategories. Based on estimates supplied by the EPA, Congress envisions that there will be

2. *Residual Risks*

Section 112(f) requires EPA to regulate major sources of hazardous air pollutants to address residual risks remaining after application of section 112(d) standards.²⁵⁸ Within six years of enactment of the 1990 Amendments, the Administrator is to report to Congress on those risks likely to remain after section 112(d) is fully implemented. Based on this report, the Administrator must recommend legislation addressing that risk.²⁵⁹ Relying on the information provided by EPA, as well as other available information, Congress may choose to amend section 112 to establish new standards governing the control of residual risks.

If Congress does not enact legislation establishing new residual risk provisions, the Administrator must determine whether additional standards are required in order to prevent an "adverse environmental effect" or to provide "an ample margin of safety to protect the public health."²⁶⁰ EPA must make this determination with regard to each regulated category and subcategory under section 112(d). If EPA determines that additional standards are necessary, it must promulgate those standards within eight years of promulgating of section 112(d) standards.²⁶¹

in total about 250 source categories. See 136 Cong. Rec. S16,926 (Oct. 27, 1990) (remarks of Senator Durenburger).

258. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(f), 104 Stat. 2399, 2543-45 (codified at 42 U.S.C.A. § 7412(f) (West Supp. 1991)).

259. *Id.* § 112(f)(1), 104 Stat. at 2543 (codified at 42 U.S.C.A. § 7412).

260. *Id.* § 112(f)(2)(A), 104 Stat. at 2543-44 (codified at 42 U.S.C.A. § 7412(f)(2)(A)).

261. *Id.* § 112(f)(2)(A), (C), 104 Stat. at 2543-44 (codified at 42 U.S.C.A. § 7412(f)(2)(A), (C)). The Amendments state that, when setting standards to prevent an adverse environmental effect, the Administrator must consider "costs, energy, safety, and other relevant factors." *Id.* § 112(f)(2)(A), 104 Stat. at 2453 (codified at 42 U.S.C.A. § 7412(f)(2)(A)).

The Amendments expressly adopt the EPA's pre-1990 approach to the definition of an ample margin of safety. *Id.* § 112(f)(2)(A), (B), 104 Stat. at 2543-44 (codified at 42 U.S.C.A. § 7412(f)(2)(A), (B)). Section 112(f)(2)(B) makes explicit reference to EPA's final rule on benzene emissions. The preamble to this rule explains that, in determining whether the public health is protected with an ample margin of safety, the Administrator must consider "all health factors" so that EPA can protect "the greatest number of persons possible." EPA, Final Rule, National Emission Standards for Hazardous Air Pollutants, 54 Fed. Reg. 38,044, 38,046 (1989) (standards codified at 40 C.F.R. pt. 61 (1990)). EPA's preamble relied heavily on the reasoning in Natural Resources Defense Council, Inc. v. EPA,

With regard to carcinogens, section 112(f)(2)(A) specifically defines the crucial phrase "an ample margin of safety to protect the public health." It provides that in the case of known, probable, or possible human carcinogens, if a section 112(d) standard does not reduce the lifetime cancer risk to the individual most exposed to emissions from that facility to less than one in one million, the "ample margin of safety" standard is not met, and the Administrator must promulgate residual risk emission standards under section 112.²⁶²

3. *Equivalent Emission Limitations Established by the Permitting Authority*

Section 112(j) establishes a program under which state or federal permitting authorities are to impose MACT standards of their own if EPA does not provide them in a timely manner.²⁶³ Where EPA has failed to issue applicable section 112(d) standards within eighteen months of the section 112(e) deadline, a permitting authority must set emission standards on a case-by-case basis for facilities in a source category. When any facility emitting a hazardous air pollutant applies for a permit under title V, the permitting authority must incorporate an emission standard for that hazardous air pollutant. If EPA has failed to promulgate the emission standard, the permitting authority must determine and incorporate a standard "equivalent to the limitation that would apply to such source if an emission standard had been promulgated in a timely manner"²⁶⁴

The provisions for equivalent emissions limitations are intended to provide a safeguard to assure that hazardous air pollutants will be effectively regulated, even if EPA does not issue

824 F.2d 1146 (D.C. Cir. 1987), in which the court allowed EPA to consider the costs of implementing the standards when evaluating the level necessary to protect the public health.

262. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(f)(2)(A), 104 Stat. at 2544 (codified at 42 U.S.C.A. § 7412(f)(2)(A)).

263. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(j), 104 Stat. 2399, 2550-52 (codified at 42 U.S.C.A. § 7412(j) (West Supp. 1991)).

264. *Id.* § 112(j)(5), 104 Stat. at 2551 (codified at 42 U.S.C.A. § 7412(j)(5)). This requirement does not take effect until a state or federal permit program is in effect under title V, and until at least 42 months after November 16, 1990. *Id.* § 112(j)(1), 104 Stat. at 2550 (codified at 42 U.S.C.A. § 7412(j)(1)).

standards. This provision is a reflection of congressional concern about potential EPA failure to take mandated steps founded in years of regulatory paralysis in the hazardous air pollution area.²⁶⁵

4. Modifications

Maximum achievable control technology standards for existing sources are to be promulgated over a ten-year period.²⁶⁶ However, section 112(g) establishes a new program under which the construction or modification of any major source of hazardous air pollution is to be subject to MACT standards much earlier.²⁶⁷ Under section 112(g), once a permit program is in effect in any state, the permitting authority must assure that MACT requirements are met by all new or modified sources. If applicable MACT standards have not been promulgated, the permitting authority must determine the appropriate level of control on a case-by-case basis.²⁶⁸

Section 112(g)(1) also establishes an offset program. Under this program, a physical change that results in an emission increase is not a "modification" if the increase is offset by a greater decrease in that source's release of the same hazardous air pollutant or another pollutant previously determined by EPA to be more hazardous.²⁶⁹

265. See *supra* notes 80-92 and accompanying text.

266. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(e), 104 Stat. at 2542-43 (codified at 42 U.S.C.A. § 7412(e)).

267. *Id.* § 112(g), 104 Stat. at 2545-46 (codified at 42 U.S.C.A. § 7412(g)). A modification is a "physical change in, or change in the method of operation of, a major source which increases the actual emissions of any hazardous air pollutant" by more than a de minimis amount, "or which results in the emission of any hazardous air pollutant not previously emitted." *Id.* § 112(a)(5), 104 Stat. at 2532 (codified at 42 U.S.C.A. § 7412(a)(5)).

268. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(g)(2), 104 Stat. 2399, 2545 (codified at 42 U.S.C.A. § 7412(g)(2) (West Supp. 1991)). If the modification or construction reflects the use of new processes or technologies capable of achieving greater emission reductions than those EPA considered when setting the standard, an EPA emission limitation that otherwise applies to an industrial category should be determined not to be applicable to the modification or construction. In that instance, the state would be required to establish a more stringent MACT standard on its own.

269. *Id.* § 112(g)(1), 104 Stat. at 2545 (codified at 42 U.S.C.A. § 7412(g)(1)). The offset program applies only to modifications, and not to the construction or

5. Area Sources

Stationary sources of air toxics that are too small to be considered major sources are termed "area sources."²⁷⁰ Although small in size, area sources are large in number and cause significant health impacts.²⁷¹ In fact, the aggregate cancer risks from area sources roughly equals the risks attributable to major sources.²⁷²

Section 112(c)(3) puts EPA on a schedule for the regulation of area sources.²⁷³ Within five years of enactment, EPA must list sufficient categories and subcategories of area sources to account for sources representing ninety percent of the aggregate area source emissions of the thirty most important hazardous air pollutants released from area sources.²⁷⁴ It is anticipated that the listed sources will reflect the conclusions of the National Urban Air Toxics Strategy required in section 112(k). The Toxics Strategy is also due five years after enactment, and must identify a strategy for achieving a seventy-five percent reduction in the cancer incidence associated with emissions from area sources.²⁷⁵

reconstruction of new sources.

Within eighteen months of the Amendments' enactment, EPA must publish guidance regarding the relative level of hazard presented by listed pollutants. *Id.* § 112(g)(1)(B), 104 Stat. at 2545 (codified at 42 U.S.C.A. § 7412(g)(1)(B)). When EPA promulgates its regulations, it should require that the offsetting reductions occur within that same unit as the emission increase. For purposes of § 112(g)(1), "source" should be interpreted to refer to the "unit," not the entire facility.

270. *Id.* § 112(a)(2), 104 Stat. at 2531 (codified at 42 U.S.C.A. § 7412(a)(2)).

271. U.S. EPA, *supra* note 122. Principal area sources of toxic emissions can be identified by the contribution that they make to the annual cancer incidence attributable to toxic emissions. Under such an approach, the most important area sources are chromium emissions from electroplating operations (10% of annual cancer incidence); woodsmoke (4%); chromium emissions from apartment-building and industrial cooling towers (3%); emissions from gas stations (2.5%); and solvent use and degreasing (1%). *Id.* Generally, EPA and the states have taken few actions to control toxic emissions from area sources directly. For instance, no regulatory controls have been imposed on chromium emissions from electroplating operations or on emissions of solvent used in degreasing.

272. *Id.*

273. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(c)(3), 104 Stat. at 2537 (codified at 42 U.S.C.A. § 7412(c)(3)).

274. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(c)(3), 104 Stat. 2399, 2537 (codified at 42 U.S.C.A. § 7412(c)(3) (West Supp. 1991)).

275. *Id.* § 112(k)(3), 104 Stat. at 2552-53 (codified at 42 U.S.C.A.

Section 112(c)(2) requires EPA to promulgate regulations for all listed categories within ten years of enactment.²⁷⁶ The regulations must impose emission limitations for each of the listed categories based on use of the MACT or, in some cases, use of generally available control technology.²⁷⁷

6. *Accidental Releases of Hazardous Air Pollutants*

Releases of toxic substances into the air can be divided into two groups: routine releases and unanticipated accidental releases.

Accidental releases occur with alarming frequency. EPA reports that between 1980 and 1987, 11,048 accidental releases of toxic chemicals occurred in the United States.²⁷⁸ These releases killed 309 people and caused 11,341 injuries. They also caused the evacuation of nearly 500,000 people.²⁷⁹ Of these releases, 4,375—nearly two a day—produced hazardous pollutant clouds. Although these releases were just forty percent of the total, they represented sixty-three percent of the accidental releases causing death or injury and seventy-five percent of the releases requiring evacuations.²⁸⁰

While some accidental releases may pose relatively minor threats to human health or the environment, others have the potential to be truly catastrophic. The most disastrous release ever was the accidental release of methyl isocyanate from a Union Carbide chemical plant in Bhopal, India. On December 3, 1984, a storage tank burst open, releasing thirty tons of methyl isocyanate into the atmosphere. The release killed over 3000 people and injured more than 200,000.²⁸¹ Surprisingly, according to an EPA study, there have been seventeen accidental releases of toxic

²⁷⁶ 7412(k)(3)).

²⁷⁷ *Id.* § 112(c)(2), (e)(1), 104 Stat. at 2537, 2542 (codified at 42 U.S.C.A. § 7412(c)(2), (e)(1)).

²⁷⁸ For all new sources of hazardous air pollutants, § 112(d)(2) requires the use of MACT. *Id.* § 112(d)(2), 104 Stat. at 2539-40 (codified at 42 U.S.C.A. § 7412(d)(2)).

²⁷⁹ Industrial Economics, Inc., *Acute Hazardous Events Data Base 1* (Aug. 1988) (prepared for Office of Policy Analysis, U.S. EPA).

²⁸⁰ *Id.* at 2.

²⁸¹ *Id.*

²⁸¹ *Id.* at 1-1. See also *supra* notes 25-26 and accompanying text.

chemicals in the United States since 1980 that had potential toxic effects greater than the Bhopal release.²⁸²

Prior to 1990, federal law contained few provisions regulating the prevention or detection of accidental releases, or assuring adequate response capabilities. In these areas, the actions of industry were essentially unregulated.²⁸³

Section 112(r) of the 1990 Amendments establishes a new program providing for prevention, detection, and response to accidental releases.²⁸⁴ Within two years of the 1990 Amendments' enactment, the Administrator must promulgate a list of not less

²⁸² Industrial Economics, Inc., *supra* note 278, at 2-23. In each case, the "quantity/toxicity ratio" of the release, a measure of the release's potential for catastrophic injury, exceeded the Bhopal ratio. Fortunately, a number of fortuitous factors prevented the U.S. releases from causing Bhopal-like injuries, including favorable weather, the remoteness of the releases, and conditions that kept some of the releases from becoming airborne. Nevertheless, five deaths did occur, a number that EPA calls "surprisingly lower than might be expected." *Id.*

²⁸³ There was some minor federal regulation of accidental releases. For instance, the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), 42 U.S.C. §§ 11001-11050 (1988), establishes local emergency planning commissions and directs these commissions to develop plans for responding to chemical accidents, including those that involve releases to the air. EPCRA also requires industrial facilities to notify the local commissions when the facilities possess toxic substances above threshold amounts and when accidental releases occur. However, EPCRA does not require industrial facilities to prevent, detect, or respond to accidental releases.

In 1988, EPA completed a survey of how industrial facilities prevent, detect, and respond to accidental releases. The survey found widespread deficiencies in current industrial practices. Only 10% of the facilities trained employees in hazard evaluation or accident prevention. More than one-third of the facilities had no preventive maintenance program. Few facilities used emergency backup systems, such as emergency power or cooling systems, to prevent accidental releases. Few used release control technologies, such as scrubbers or flares, to prevent accidentally released gases from reaching the ambient air. Fewer than half of the facilities used leak detectors. The most common method for detecting accidental releases was direct observation by employees—even though this method exposes employees to toxic gases and is ineffectual in the case of odorless and invisible gases. Less than 10% of the facilities used perimeter monitoring to detect when accidentally released gases escape the facility boundaries. Roughly one-third of the facilities even lacked procedures for determining when an accidental release justified notifying local authorities. U.S. EPA, *REVIEW OF EMERGENCY SYSTEMS: REPORT TO CONGRESS* (1988).

²⁸⁴ Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(r), 104 Stat. 2399, 2563-73 (codified at 42 U.S.C.A. § 7412(r) (West Supp. 1991)).

than 100 substances which may reasonably be expected to cause serious adverse effects to human health or the environment in the event of an accidental release.²⁸⁵ When determining whether to list a particular compound, the Administrator must consider the severity of adverse health effects, the likelihood of accidental releases, and the number of people likely to be exposed if there is a release.²⁸⁶ At the time a substance is listed under section 112(r), the Administrator is to establish a threshold quantity reflecting the minimum amount that would reasonably be anticipated to pose a serious adverse effect if accidentally released.²⁸⁷

Sources that hold listed substances in greater than threshold quantities are required to comply with accident prevention regulations under section 112(r)(7).²⁸⁸ Each such source must prepare and implement a risk management plan to detect and prevent or minimize accidental releases.²⁸⁹ The plan must evaluate possible worst case accidental releases, describe any accidental releases that occurred over the prior five years, provide an accident prevention program, and develop a response program outlining actions to be taken in the event of a release.²⁹⁰

Section 112(r) also establishes a new Chemical Safety and Hazard Investigation Board to investigate accidental chemical releases and recommend methods to avoid future releases.²⁹¹ Pat-

285. *Id.* § 112(r)(3), 104 Stat. at 2564 (codified at 42 U.S.C.A. § 7412(r)(3)).

The list must include 16 statutorily specified compounds: chlorine, anhydrous ammonia, methyl chloride, ethylene oxide, vinyl chloride, methyl isocyanate, hydrogen cyanide, ammonia, hydrogen sulfide, toluene diisocyanate, phosgene, bromine, anhydrous hydrogen chloride, hydrogen fluoride, anhydrous SO₂, and sulfur trioxide. *Id.*

286. *Id.* § 112(r)(4), 104 Stat. at 2564 (codified at 42 U.S.C.A. § 7412(r)(4)).

287. In establishing the minimum amount, the Administrator must consider the toxicity, reactivity, volatility, dispersibility, combustibility, or flammability of the substance and the amount of the substance that is known to cause serious adverse effects. *Id.* § 112(r)(5), 104 Stat. at 2565 (codified at 42 U.S.C.A. § 7412(r)(5)). The Administrator may exempt any substance that is "a nutrient used in agriculture when held by a farmer." *Id.*

288. *Id.* § 112(r)(7)(B)(ii), 104 Stat. at 2571 (codified at 42 U.S.C.A. § 7412(r)(7)(B)(ii)).

289. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(r)(7)(B)(iii), 104 Stat. 2399, 2571 (codified at 42 U.S.C.A. § 7412(r)(7)(B)(iii) (West Supp. 1991)).

290. *Id.*

291. *Id.* § 112(r)(6), 104 Stat. at 2565-70 (codified at 42 U.S.C.A. § 7412(r)(6)).

terned after the National Transportation Safety Board, the Chemical Safety and Hazard Investigation Board is an independent entity authorized to conduct investigations, issue periodic reports to Congress and federal agencies, establish reporting requirements, conduct research, hold hearings, and make recommendations.²⁹²

7. Coastal Water Protection

Section 112(m) directs the Administrator to investigate the sources of atmospheric deposition of hazardous air pollutants and their transformation products into the Great Lakes, the Chesapeake Bay, and the nation's coastal waters. EPA must also evaluate the adverse effects on human health and the environment caused by such deposition.²⁹³ EPA must consider the tendency of hazardous air pollutants to bioaccumulate and the effects of indirect exposure pathways.²⁹⁴ The Administrator is required to report the results of the study to Congress within three years,²⁹⁵ and within five years, to promulgate such further emission standards or control measures as may be necessary to prevent adverse effects.²⁹⁶

8. Radionuclides

The 1990 Amendments include several provisions that specif-

292. *Id.*

293. *Id.* § 112(m), 104 Stat. at 2556-58 (codified at 42 U.S.C.A. § 7412(m)). EPA, in its discretion, may extend the study to pollutants other than hazardous air pollutants. *Id.* This study was inspired by the fact that many Great Lakes fish species are no longer considered edible because of toxic contamination. H.R. Rep. No. 490, *supra* note 165, at 320.

294. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(m)(1)(D), (E), (6), 104 Stat. 2399, 2556, 2558 (codified at 42 U.S.C.A. § 7412(m)(1)(D), (E), (6) (West Supp. 1991)).

295. *Id.* § 112(m)(5), 104 Stat. at 2557-58 (codified at 42 U.S.C.A. § 7412(m)(5)). In the report to Congress, EPA is to determine whether other provisions of § 112 are adequate to prevent serious adverse effects to human health and serious or widespread environmental effects. *Id.* § 112(m)(5)(E), 104 Stat. at 2558 (codified at 42 U.S.C.A. § 7412(m)(5)(E)). In evaluating the provisions of § 112, EPA will have to consider effects from indirect exposure pathways associated with atmospheric deposition of hazardous air pollutants on the Great Lakes, the Chesapeake Bay, and coastal waters. *Id.* § 112(m)(1)(D), (5), 104 Stat. at 2556-58 (codified at 42 U.S.C.A. § 7412(m)(1)(D), (5)).

296. *Id.* § 112(m)(6), 104 Stat. at 2558 (codified at 42 U.S.C.A. § 7412(m)(6)).

ically address the regulation of radionuclide emissions. Probably the most important is section 112(d)(9), which provides that the Administrator is not required to regulate radionuclide emissions from a category or subcategory of facilities licensed by the Nuclear Regulatory Commission (NRC). However, the Administrator must conclude that NRC regulation of radionuclide emissions from that source category provides an ample margin of safety to protect the public health.²⁹⁷ This determination must be made independently for each source category and must be made by rule.²⁹⁸

Even if the EPA determines that the NRC regulations are adequate, the Agency retains authority to regulate radionuclides emissions from all sources. Section 112(f)(2), which defines "ample margin of safety," requires the Administrator to conclude that the NRC regulation does not protect public health with an ample margin of safety if the excess lifetime risk of cancer presented by the radionuclide emissions to the most exposed individual exceeds one in one million.²⁹⁹

9. Control of Incinerator Emissions

Incinerators are a pervasive source of hazardous air pollutant emissions, especially in urban areas. As landfill space has become limited and waste disposal requirements have tightened, incineration has become an increasingly popular form of waste disposal. The wide array of materials subject to incineration, from rubber

297. *Id.* § 112(d)(9), 104 Stat. at 2542 (codified at 42 U.S.C.A. § 7412(d)(9)).

298. *Id.*

299. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(f)(2)(A), 104 Stat. 2399, 2544 (codified at 42 U.S.C.A. § 7412(f)(2)(A)) (West Supp. 1991). It is doubtful if NRC regulation of most sources can meet this test, or for that matter any health-based test. NRC policy rests on a standard which is not based on health, but instead requires emissions to be "as low as reasonably achievable." NRC, Policy Statement on Exemptions from Regulatory Control, 53 Fed. Reg. 49,889 (1988) (codified at 10 C.F.R. § 20.1). EPA's dose limit for public exposure to radionuclide emissions is set at a 1 in 10,000 cancer risk. According to the Agency, this dose limit corresponds to a dose equivalent limit of 10 millirem per year (mrem/yr). In contrast, the NRC dose limit is set at 500 mrem/yr, which corresponds to a cancer risk of about 1 in 200. Hence, NRC standards allow for lifetime cancer risks to the most exposed individual some 50 times higher than provided in EPA's radionuclide regulations. See Letter from Richard Guimond, Director Office of Radiation Programs, U.S. EPA, to Senator Timothy Wirth (Feb. 6, 1990).

tires to newsprint to metals, gives rise to a comparably wide array of hazardous emissions, including both heavy metals and organic chemicals.³⁰⁰ Without aggressive pollution controls, these emissions can present significant health risks.³⁰¹

The 1990 Amendments establish a broad new program to assure that emissions from the full range of new and existing incinerators are aggressively controlled.³⁰² Incinerator emissions are to be regulated both under section 111, where EPA has already initiated a regulatory effort for new and existing facilities, and under section 129.³⁰³ The 1990 Amendments establish a schedule that calls for EPA to regulate large municipal waste incinerators within one year; hospital, medical and infectious waste incinerators within two years; and commercial and industrial waste incinerators within four years.³⁰⁴ EPA's emission limitations on new and existing incinerators are to reflect the "maximum degree of reduction in emissions," a term defined to parallel the section 112(d) MACT standard.³⁰⁵ For the purposes of controlling residual risks under section 112(f), section 129 incinerator regulations are treated like section 112(d) MACT standards.³⁰⁶ Thus, incinerator standards must be reviewed within eight years of pro-

300. See generally *Control of Air Pollution from Municipal Waste Incinerators: Hearing Before the Subcomm. on Health and the Environment of the House Comm. on Energy and Commerce*, 100th Cong., 1st Sess. (1987).

301. See, e.g., *id.* at 49 (testimony of Ellen Silbergeld, Senior Scientist, Environmental Defense Fund).

302. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 305(a), § 129, 104 Stat. 2399, 2577-83 (codified at 42 U.S.C.A. § 7429 (West Supp. 1991)).

303. *Id.* § 129(a), 104 Stat. at 2578-79 (codified at 42 U.S.C.A. § 7429(a)). The 1990 Amendments specifically provide that EPA regulations under § 111, 42 U.S.C.A. § 7411, part of an EPA consent decree in *New York v. Reilly*, Civ. No. 89-1729 (D.D.C. filed Aug. 3, 1989), are to continue on schedule and be subsequently modified to conform to § 129 in accordance with a statutory schedule. *Id.*

304. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 305(a), § 129(a), 104 Stat. at 2578 (codified at 42 U.S.C.A. § 7429(a)).

305. Compare *id.* § 129(a)(2), 104 Stat. at 2578-79 (codified at 42 U.S.C.A. § 7429) with *id.* § 112(d), 104 Stat. at 2539 (codified at 42 U.S.C.A. § 7412(d)). Numerical emission limitations are specifically required for a list of pollutants provided. *Id.* § 129(a)(4), 104 Stat. at 2579 (codified at 42 U.S.C.A. § 7429(a)(4)). Existing units must comply with the regulations as "expeditiously as practicable," but not later than the earlier of two dates: (1) three years after the approval of a SIP, or (2) five years after the promulgation of the regulations. By contrast, regulations for new units are effective six months after promulgation. *Id.* § 129(f), 104 Stat. at 2581 (codified at 42 U.S.C.A. § 7429(f)).

306. *Id.* § 129(b)(3), 104 Stat. at 2583 (codified at 42 U.S.C.A. § 7429(b)(3)).

mulgation, and EPA must determine whether additional controls are necessary.³⁰⁷

10. Coke Ovens

Coke ovens are important sources of hazardous air pollution emissions that have remained unregulated, despite the fact that coke oven emissions are listed as hazardous air pollutants under section 112.³⁰⁸ Coke ovens are subject to a specifically tailored regime in the 1990 Amendments designed to assure that the most effective pollution control steps available are used as quickly as possible,³⁰⁹ while at the same time, minimizing the possibility that coke ovens will have to close down because of inability to meet residual risk standards under section 112(f).

Section 112(d)(8) provides specifically that, in establishing MACT standards for new and existing coke ovens, the Administrator must consider specified technologies.³¹⁰ In addition, the Administrator is directed to establish work practice regulations, which must be complied with three years after enactment. These regulations must require the use of luting compounds and other door and jam cleaning processes at all existing and new coke ovens.³¹¹ No other source category is subject to section 112(d) con-

307. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(f)(2), 104 Stat. 2399, 2543-44 (codified at 42 U.S.C.A. § 7412(f)(2) (West Supp. 1991)).

308. The failure to regulate hazardous air pollutant emissions from coke ovens is a violation of pre-1990 CAA § 112(b). Section 112(b) required regulation of all sources of a hazardous air pollutant within one year of EPA's listing that pollutant. 42 U.S.C. § 7412(b)(B) (1988), amended by Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(b), 104 Stat. at 2532-37 (codified at 42 U.S.C.A. § 7412(b)).

309. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(d)(8), 104 Stat. at 2541-42 (codified at 42 U.S.C.A. § 7412(d)(8)).

310. *Id.* § 112(d)(8)(A), 104 Stat. at 2541 (codified at 42 U.S.C.A. § 7412(d)(8)(A)). For new coke ovens, the Administrator is directed to consider the extremely low-emission Jewell design Thompson nonrecovery coke oven batteries. *Id.* § 112(d)(8)(A)(ii), 104 Stat. at 2541 (codified at 42 U.S.C.A. § 7412(d)(8)(A)(ii)). For existing coke oven batteries, the use of sodium silicate luting compounds to prevent door leaks must be considered. *Id.* § 112(d)(8)(A)(i), 104 Stat. at 2541 (codified at 42 U.S.C.A. § 7412(d)(8)(a)(i)). A luting compound is used to pack a joint or coat a surface to make it impervious to gas or liquid. See Webster's New COLLEGIATE DICTIONARY (1979). Such compounds are used to seal leaks through which coke oven gases can escape.

311. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301,

tol requirements which take effect so promptly.

To ensure the financial survival of coke ovens, section 112(i)(8) permits coke ovens to defer section 112(f) residual risk requirements until the year 2020.³¹² To qualify for the extension, coke ovens must meet an eight-percent leaking door standard, and comply with several other requirements specified in section 112(d)(8)(C) within three years of enactment.³¹³ Facilities receiving an extension also must meet other specific requirements.³¹⁴ By January 1, 1998, the coke oven must comply with LAER standards as defined in section 171 of the Act.³¹⁵ Detailed minimum requirements for the 1998 coke oven LAER standard, including a three-percent leaking door standard are also provided.³¹⁶ EPA is to update the LAER standard by January 1, 2007, and coke ovens securing deferral of the section 112(f) standard are required to comply with this updated LAER standard by the year 2010.³¹⁷

E. Title IV: Acid Deposition Control

The CAA was originally designed primarily to address air quality problems caused by high pollution levels relatively near the pollution source. It was expected that as long as pollution levels did not exceed the ambient standards, air quality objectives

§ 112(d)(8)(B), 104 Stat. at 2541 (codified at 42 U.S.C.A. § 7412(d)(8)(B)).

312. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(i)(8), 104 Stat. 2399, 2549-50 (codified at 42 U.S.C.A. § 7412(i)(8) (West Supp. 1991)).

313. *Id.*

314. *Id.* § 112(i)(8)(B), (C), (E), 104 Stat. at 2549-50 (codified at 42 U.S.C.A. § 7412(i)(8)(B), (C), (E)).

315. *Id.* § 112(i)(8)(B)(i), 104 Stat. at 2549 (codified at 42 U.S.C.A. § 7412(i)(8)(B)(i)). The LAER standard in § 171 applies to new pollution sources in nonattainment areas. It is the CAA's most demanding technology-based pollution control standard, requiring all coke ovens to use any technology that has been successfully used on any coke oven. 42 U.S.C. § 7501(3) (1988). This standard would require existing coke ovens to install the technology just as if they were new facilities. LAER has never before been applied to existing sources, and might well require that sources reconfigure to take advantage of the emission reductions achievable through the Jewell design facilities.

316. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(i)(8)(B), 104 Stat. at 2549-50 (codified at 42 U.S.C.A. § 7412(i)(8)(B)).

317. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(i)(8)(C), 104 Stat. 2399, 2550 (codified at 42 U.S.C.A. § 7412(i)(8)(C) (West Supp. 1991)).

would be served. In the 1970s many states resorted to very tall smokestacks to disperse pollution, although the approach was of dubious legality at the time.³¹⁸ Tall smokestacks dispersed the pollutants and allowed the area around the smokestacks to achieve the ambient standard without the use of expensive control technology. Little thought was given to the possibility that the pollution might cause environmental damage when it returned to earth.³¹⁹

Scientists have since learned that SO₂ and nitrogen dioxide pollution from power plants, autos, and other sources can be carried hundreds or even thousands of miles through the atmosphere, chemically transformed in the process, and eventually returned to earth as sulfuric or nitric acids.³²⁰ These acids often come to earth in rain or snow, but sometimes they return as "dry deposition." Such acid pollution has been associated with a variety of harmful effects, including the acidification of lakes, decline of forests, damage to man-made materials, and serious human health impacts.³²¹

Title IV of the 1990 Amendments establishes a new program

318. In 1974, EPA's approval of Georgia's state implementation plan, which relied on the use of tall smokestacks rather than emission limitations, was successfully challenged in court. *Natural Resources Defense Council, Inc. v. EPA*, 489 F.2d 390 (5th Cir. 1974), reversed on other grounds *sub nom.* *Train v. Natural Resources Defense Council, Inc.*, 421 U.S. 60 (1975).

319. For a discussion of the shortcomings of the CAA structure, as it existed prior to the 1990 Amendments, in addressing the acid rain problem, see Wetstone, *Air Pollution Control Laws in North America and the Problem of Acid Rain and Snow*, 10 *Env't. L. Rep. (Env't. L. Inst.)* 50,001 (Jan. 1980).

320. For a good general discussion of the acid rain problem see Office of Technology Assessment, *Acid Rain and Transported Air Pollutants: Implications for Public Policy* (June 1984). See also CONGRESSIONAL RESEARCH SERVICE, *SUBCOMMITTEE ON HEALTH AND THE ENVIRONMENT OF THE HOUSE COMM. ON ENERGY AND COMMERCE*, 98TH CONG., 2D SESS., *ACID RAIN: A SURVEY OF DATA AND CURRENT ANALYSIS* (Comm. Print 1984); WETSTONE & ROSENCRANZ, *ACID RAIN IN EUROPE AND NORTH AMERICA: NATIONAL RESPONSES TO AN INTERNATIONAL PROBLEM* (1988). The National Academy of Sciences has prepared several major reports on acid rain, including: *ATMOSPHERE-BIOSPHERE INTERACTIONS* (1981); *ACID DEPOSITION: ATMOSPHERIC PROCESSES IN EASTERN NORTH AMERICA* (1983); and *ACID DEPOSITION, LONG TERM TRENDS* (1986).

321. Office of Technology Assessment, *supra* note 320. The acid aerosols formed from SO₂ and NO_x emissions pose potentially severe health risks. These aerosols irritate the lungs and cause constricted breathing. Epidemiological studies have linked these aerosols to some 50,000 premature deaths per year. *Id.* at 47.

to control emissions of the two pollutants that cause acid rain: SO₂ and NO_x. The program uses a market-based allowance system to reduce SO₂ emissions from utilities by nearly fifty percent.³²² In addition, it places a nationwide limit on industrial SO₂ emissions that reduces industrial SO₂ emissions by about one million tons.³²³ In conjunction with other expected reductions of five hundred thousand tons from the desulfurization of diesel fuel, the legislation will produce a net reduction of ten million tons of SO₂ from 1980 levels, a forty percent decrease.³²⁴

Title IV also requires the Administrator to set emission limitations to reduce NO_x emissions from coal-fired utilities. These standards should reduce NO_x emissions by two million tons annually from 1980 levels.

1. The Sulfur Dioxide Reduction Programs

Title IV establishes two basic programs to reduce SO₂ emissions: a complex market-based allowance program for reducing SO₂ emissions from utility sources, and a regulatory program to cap industrial SO₂ emissions.³²⁵

a. The Sulfur Dioxide Allowance Program

To achieve SO₂ reductions from the utility industry, title IV relies on a novel free-market approach that grants utility sources a limited number of marketable emission allowances. Each SO₂ allowance, in essence, grants a source permission to release one

322. The allowance system caps utility emissions at 8.9 million tons a year by 2000. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 401, § 403(a), 104 Stat. 2399, 2589-90 (codified at 42 U.S.C.A. § 7651b(a) (West Supp. 1991)). This is a reduction of 8.5 million tons from 1980 levels. See H.R. Rep. No. 490, *supra* note 165, at 355.

323. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 401, § 406, 104 Stat. at 2613 (codified at 42 U.S.C.A. § 7651e); see U.S. EPA, *Economic Analysis of Title V of the Administration's Proposed Clean Air Act Amendments* (Sept. 1989); see also H.R. Rep. No. 490, *supra* note 165, at 344.

324. H.R. Rep. 490, *supra* note 165, at 355.

325. Utility sources produce 70% of the nationwide SO₂ emissions, with old coal-fired plants causing 90% of these emissions. Industrial sources produce most the remainder of nationwide SO₂ emissions. House Subcomm. on Health and the Environment, *Clean Air Facts* (Feb. 2, 1990), reprinted in 136 Cong. Rec. H2513, H2536-37 (daily ed. May 21, 1990) (statement of Representative Waxman).

tion of SO₂ pollution in a specified calendar year.³²⁶ Allowances can be used for current emissions, sold, or held in reserve for future emission increases.³²⁷ After the program becomes fully effective in 2000, it will be illegal for any utility unit to release SO₂ pollution for which it does not have an allowance.³²⁸

SO₂ emission reductions under the program are achieved in two phases. Phase I seeks to achieve a three to four million ton reduction by the year 1995. It applies to power plants that are large (100 megawatts or greater) and especially dirty (emitting 2.5 pounds or more of SO₂ per million British thermal unit of fossil fuel consumed).³²⁹ There are 110 power plants affected by phase I.³³⁰

The balance of the SO₂ reductions are to be achieved by the year 2000 in phase II.³³¹ In phase II, all existing utility units receive allowances and become subject to the prohibition on emitting SO₂ in excess of the allowances. In general, the allowance allocations in phase II require the large, dirty units regulated in phase I to make additional emission reductions,³³² require high-polluting units that are too small to be affected by phase I to make reductions for the first time,³³³ and caps emissions from clean utility units while providing them with sufficient allowances to accommodate twenty percent growth.³³⁴

A narrow exception to the year 2000 deadline is established for units that repower using "clean-coal technologies"—that is,

326. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 401, § 402(3), 104 Stat. at 2585 (codified at 42 U.S.C.A. § 7651a(3)).

327. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 401, § 403(b), 104 Stat. 2399, 2590-91 (codified at 42 U.S.C.A. § 7651b(b) (West Supp. 1991)). Within eighteen months of the 1990 Amendments' enactment, EPA must promulgate regulations governing the transfer of allowances. *Id.*

328. *Id.* § 411, 104 Stat. at 2623-24 (codified at 42 U.S.C.A. § 7651j).

329. H.R. Rep. No. 490, *supra* note 165, at 377.

330. The affected power plants and the allowances allotted to each are statutorily listed in Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 401, § 404(e) tab. A, 104 Stat. at 2597-601 (codified at 42 U.S.C.A. § 7651c tab. A).

331. *Id.* § 405, 104 Stat. at 2605-13 (codified at 42 U.S.C.A. § 7651d).

332. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 401, § 405(b), 104 Stat. 2399, 2606-07 (codified at 42 U.S.C.A. § 7651d(b) (West Supp. 1991)).

333. *Id.* § 405(c), 104 Stat. at 2607-08 (codified at 42 U.S.C.A. § 7651d(c)).

334. *Id.* § 405(d)-(f), 104 Stat. at 2608-10 (codified at 42 U.S.C.A. § 7651d(d)-(f)).

build new boilers using new technologies for burning coals cleanly. These units are allowed a deadline extension until 2004.³³⁵ The repowering extension does not apply to clean-coal technologies that are used to retrofit, as opposed to rebuild, existing boilers.³³⁶

b. The "Greenfield" Cap

A major feature of the allowance system is that all new utility units must acquire allowances for their emissions by the year 2000 or before commencing operation, whichever is later.³³⁷ This is the "Greenfield cap" on emissions. The cap assures that the emission reductions achieved by the year 2000 under this title will not be eroded in future years as new pollution sources come on line and add to the nation's SO₂ emissions. Under the cap, aggregate national SO₂ emissions from the utility sector will remain constant at 8.9 million tons after 2000, because new units will have to secure allowances from existing sources, which must reduce emissions commensurate with new unit growth.

2. Allocation Formulas

Unlike debates in earlier Congresses, the primary acid rain debate in the 101st Congress was not about whether to control acid rain or how stringently to do so. President Bush's insistence on a ten million ton reduction and a permanent cap on emissions effectively put that debate to rest.³³⁸ Instead, the main debate was among utilities over how the pool of 8.9 million allowances would be allocated. High-polluting midwestern utilities argued for additional allowances on the ground that most of the burden of the clean up fell to them. Low-polluting utilities in the west and

335. *Id.* § 409, 104 Stat. at 2619-21 (codified at 42 U.S.C.A. § 7651h).

336. The definition of "repowering" in § 402 requires "replacement of an existing coal-fired boiler." *Id.* § 402(12), 104 Stat. at 2587 (codified at 42 U.S.C.A. § 7651a(12)).

337. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 401, § 403(e), 104 Stat. 2399, 2591 (codified at 42 U.S.C.A. § 7651b(e) (West Supp. 1991)).

338. An ironic moment occurred in early in 1990 when the Edison Electric Institute, the chief lobbying arm of the utility industry, decided to advocate acid rain controls that closely resembled H.R. 4567 of the 99th Congress. See *infra* notes 456-457 and accompanying text.

south insisted that "clean" utilities should receive additional allowances as recognition of their past efforts.³³⁸ And literally dozens of utilities pled special cases that, they said, warranted particularly favorable treatment.

A complex set of allowance formulas resulted from the debate. The basic allowance rules are straightforward. In phase II, utility units that in 1985 had an emission rate above 1.2 lbs of SO₂ per million British thermal unit of fossil fuel consumed (lbs/mmBtu) generally receive allowances equal to the product of 1.2 lbs/mmBtu multiplied by the unit's average fossil fuel consumption over the baseline period of 1985 through 1987.³⁴⁰ Units with 1985 emission rates below 1.2 lbs/mmBtu generally receive allowances equal to the product of their 1985 emission rate multiplied by 120% of their baseline fossil fuel consumption.³⁴¹

Exceptions to the basic rules are widespread, and in many cases, inexplicable except by the complex politics through which the acid rain title was negotiated. Utilities in Florida receive an additional forty thousand allowances each year.³⁴² A utility in Ohio receives special treatment because it happens to have twenty percent of its units controlled by flue gas desulfurization devices, more than ten percent of its capacity below seventy-five megawatts (MWe), and large units with "difficult or very difficult FGD Retrofit Cost Factors."³⁴³ In total, title IV establishes more than forty different allowance formulas. The plethora of allowance formulas could create an environmental risk. There is a possibility that if all units received their full allowance allotments, more than 8.9 million allowances would be awarded annually, breaking the title IV cap on SO₂ emissions. The final legislation

339. *Electric Utilities Critical of Clean Air Plan*, N.Y. Times, Nov. 13, 1989, at D1, col. 1.

340. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 401, § 405(b)(1), 104 Stat. at 2606 (codified at 42 U.S.C.A. § 7651d(b)(1)). For a more detailed discussion of the allowance system and the allocation on formula, see H.R. Rep. No. 490, *supra* note 165, at 315-27.

341. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 401, § 405(d)-(f), 104 Stat. 2399, 2608-10, (codified at 42 U.S.C.A. § 7651d(d)-(f) (West Supp. 1991)). The extra 20% is to provide a cushion for growth.

342. The allowances are awarded to utilities in any state with an installed electrical generating capacity of more than 30,000 kilowatts that experienced more than a 25% increase in population during the 1980s. *Id.* § 405(f)(1), 104 Stat. at 2612 (codified at 42 U.S.C.A. § 7651d(i)(1)).

343. *Id.* § 405(c)(5), 104 Stat. at 2608 (codified at 42 U.S.C.A. § 7651d(c)(5)).

insures against this possibility by requiring EPA to issue no more than 8.9 million allowances in the aggregate each year.³⁴⁴ If the allowances that would otherwise be issued under the terms of the title exceed 8.9 million, EPA must make pro rata adjustments to reduce the total to 8.9 million.³⁴⁵ In effect, this provision—usually termed the "ratchet"—guarantees that the special formulas are funded out of the allowances that would otherwise be awarded to other utilities and not at the expense of the environment.

a. Reserves and Auctions

The allocation scheme is further complicated by a series of allowance "reserves" that are used to provide allowances for a variety of purposes. There are three main reserves: one to promote technological means of SO₂ control ("scrubbing") in order to preserve markets for high-sulfur coal,³⁴⁶ one to fund many of the special interest fixes in phase II,³⁴⁷ and one to fund annual auctions of allowances.³⁴⁸

The first and second reserves have a similar heritage. The Bush Administration's original proposal required the phase I reductions to begin in 1996 and the phase II reductions to begin in 2001.³⁴⁹ The 1990 Amendments accelerate the phase I and phase II requirements by one year, to 1995 and 2000, respectively.³⁵⁰ The early emission reductions achieved in each of these years are then placed into two reserves. The 1995 reductions provide bonus allowances to units that elect to reduce SO₂ emissions by installing scrubbers.³⁵¹ The 2000 reductions provide bonus allowances to

344. *Id.* § 403(a), 104 Stat. at 2589 (codified at 42 U.S.C.A. § 7651b(a)).

345. *Id.*

346. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 404(a)(2), 104 Stat. 2399, 2593 (codified at 42 U.S.C.A. § 7651(a)(2) (West Supp. 1991)).

347. *Id.* § 405(a)(2), 104 Stat. at 2605 (codified at 42 U.S.C.A. § 7651d(a)(2)).

348. *Id.* § 416(b), 104 Stat. at 2627 (codified at 42 U.S.C.A. § 7651o(b)).

349. H.R. 3030, 101st Cong. 1st Sess. §§ 504, 505 (1990) (as introduced).

350. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 401, § 404(a)(1), 405(a)(1), 104 Stat. at 2592-93, 2605 (codified at 42 U.S.C.A. §§ 7651c(a)(1), 7651d(a)(1)).

351. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 401, § 404(a)(2), 104 Stat. 2399, 2593 (codified at 42 U.S.C.A. § 7651c(a)(2) (West Supp. 1991)). The allowances placed in the reserve are to be allocated pursuant to § 404(d). *Id.* Section 404(d) governs extensions granted to units that need additional time to meet phase I standards. See *id.* § 404(d), 104 Stat. at 2594-96 (codi-

fund portions of the allowance formulas in phase II.³⁵²

The third major reserve is funded by withholding 2.8% of the allowances that would otherwise be allocated under title IV.³⁵³ Some of these allowances are reserved for sale to independent power producers, which otherwise would have no guaranteed access to allowances.³⁵⁴ The remainder are to be auctioned annually by EPA to promote a market in allowances.³⁵⁵ The proceeds of these sales flow back to the utilities that contributed allowances to the reserve.³⁵⁶

b. Relationship of the Allowance Program to Other Clean Air Act Requirements

A crucial limitation on the allowance program is the continued applicability of all other provisions of the CAA. A market-based allowance system can reduce aggregate SO₂ emissions effectively and at low cost. Its flexibility allows sources with low clean-up costs to over-control and sell the resulting allowances to sources with high clean-up costs. The very flexibility that is the hallmark of the allowance system, however, can pose risks to localized areas. A unit permitted to release more pollution because it buys allowances can pose health threats to nearby residents. Similarly, a unit on the boundary of a national park could threaten park visibility with its emissions. The 1990 Amendments address these concerns by superimposing the allowance system on top of the existing programs in the CAA that protect public health and preserve air quality in clean air areas. Thus, although allowances are freely tradeable, they can be used by utilities only where resulting emissions would not cause a violation of any ambient air quality standards or significantly deteriorate air quality in clean areas.³⁵⁷

fixed at 42 U.S.C.A. § 7651c(d)).

352. *Id.* § 405(a)(2), 104 Stat. at 2605 (codified at 42 U.S.C.A. § 7651d(a)(2)).

353. *Id.* § 416(b), 104 Stat. at 2627 (codified at 42 U.S.C.A. § 7651c(b)).

354. *Id.* § 416(c), 104 Stat. at 2627-29 (codified at 42 U.S.C.A. § 7651c(c)).

355. *Id.* § 416(d) 104 Stat. at 2629-30 (codified at 42 U.S.C.A. § 7651c(d)).

356. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 401, § 416(c)(6), (d)(3), 104 Stat. 2399, 2629, 2630 (codified at 42 U.S.C.A. § 7651c(c)(6), (d)(3) (West Supp. 1991)).

357. *Id.* § 403(f), 104 Stat. at 2591-92 (codified at 42 U.S.C.A. § 7651b(f)).

3. *The Program for Industrial Sources*

Roughly twenty-five percent of nationwide SO₂ emissions come from industrial SO₂ sources, such as copper smelters, pulp and paper mills, and oil refineries.³⁵⁸ In developing its proposal for a ten million ton SO₂ reduction, the Bush Administration assumed that these emissions would decline to 5.6 million tons by 2000, a reduction of one million tons from 1980 levels.³⁵⁹ But the Administration bill did not propose any control program to insure that these reductions would actually occur.

The 1990 Amendments in effect codify this assumption by imposing a nationwide cap on industrial SO₂ emissions, to be enforced by a far-reaching grant of authority to EPA. Section 406 of the Amendments requires EPA to report on industrial SO₂ emissions every five years.³⁶⁰ If any of these reports show that industrial SO₂ emissions will exceed 5.6 million tons, EPA must promulgate regulations that reduce the emissions to that figure.³⁶¹

4. *The Nitrogen Oxides Reduction Program*

Nitrogen oxides emissions are the other major contributor to acid rain, causing roughly one-third of the acid rain in the east and more in the west.³⁶² Forty-five percent of these emissions come from mobile sources,³⁶³ which are controlled under title II. The other fifty-five percent of NO_x emissions come from stationary sources.³⁶⁴ They are controlled under three programs in the 1990 Amendments. New section 182(f) requires NO_x control in ozone nonattainment areas and ozone transport regions. In these areas, existing sources must use RACT, and new sources must meet the LAER standard must also offset emissions.³⁶⁵

358. Office of Technology Assessment, *supra* note 320, at 150.

359. U.S. EPA, Economic Analysis of Title V of the Administration's Proposed Clean Air Act Amendments (Sept. 1989).

360. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 406, § 401 note, 104 Stat. 2399, 2632-33 (codified at 42 U.S.C.A. § 7651 note (West Supp. 1991)).

361. *Id.* § 406(b), § 401 note, 104 Stat. at 2633 (codified at 42 U.S.C.A. § 7651 note).

362. See Office of Technology Assessment, *supra* note 320.

363. *Id.* at 151.

364. *Id.*

365. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103,

In addition, section 189(e) mandates control of NO_x as a precursor to PM-10 pollution.³⁶⁶ For existing sources, major sources of NO_x located in moderate PM-10 nonattainment areas must use reasonably available control measures,³⁶⁷ and major NO_x sources in serious PM-10 nonattainment areas must use the best available control measures.³⁶⁸ New major NO_x sources in PM-10 nonattainment areas are subject to new source review requirements under section 173.³⁶⁹

Further, title IV establishes controls on NO_x emissions from coal-fired utility units.³⁷⁰ These requirements are intended to supplement, not replace, the requirements that are applicable to NO_x sources under other provisions, including sections 182(f) and 189(e). In general, EPA will set emission standards for existing coal-fired NO_x units based on the best retrofit technology.³⁷¹ Coal-fired utility units must comply with the NO_x requirements established under title IV at the time they become subject to the title IV SO₂ limitations.³⁷² Title IV also directs EPA to revise the new source performance standards for all fossil-fuel combustion

§ 182(f), 104 Stat. 2399, 2439-40 (codified at 42 U.S.C.A. § 7511a(f) (West Supp. 1991)). See *supra* notes 165-176 and accompanying text.

366. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 182(e), 104 Stat. at 2438-39 (codified at 42 U.S.C.A. § 7511a(e)). A discussion of the PM-10 pollution control program is provided *supra* notes 202-208 and accompanying text.

367. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 105, § 189(a)(1)(C), 104 Stat. at 2460-61 (codified at 42 U.S.C.A. § 7513a(a)(1)(C)).

368. *Id.* § 189(b)(1)(B), 104 Stat. at 2461 (codified at 42 U.S.C.A. § 7513a(b)(1)(B)).

369. *Id.* §§ 189(a)(1)(A), (b)(1), 173, 104 Stat. at 2460, 2461, 2415-17 (codified at 42 U.S.C.A. §§ 7513a(a)(1)(A), (b)(1), 7503).

370. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 401, § 407, 104 Stat. 2399, 2613-15 (codified at 42 U.S.C.A. § 7651f (West Supp. 1991)).

371. *Id.* § 407(b), 104 Stat. at 2613-14 (codified at 42 U.S.C.A. § 7651f(b)). The 1990 Amendments set the specific emission rates for tangentially fired boilers and dry bottom wall-fired boilers. *Id.* § 407(b)(1), 104 Stat. at 2613-14 (codified at 42 U.S.C.A. § 7651f(b)(1)). The 1990 Amendments then direct the Administrator to set standards for wet bottom wall-fired boilers, cyclones, cell burner units, and all other types of utility boilers. The Administrator must base the emission rates "on the degree of reduction achievable through the retrofit application of the best system of continuous emission reduction, taking into account available technology, costs and energy and environmental impacts" *Id.* § 407(b)(2), 104 Stat. at 2614 (codified at 42 U.S.C.A. § 7651f(b)(2)).

372. *Id.* § 407(a), 104 Stat. at 2613 (codified at 42 U.S.C.A. § 7651f(a)).

units.³⁷³ The title IV NO_x requirements are intended to reduce NO_x emissions by two million tons below 1980 levels.

F. Title VI: Protection of the Stratospheric Ozone Layer

By the fall of 1990, as Congress took the final steps to enact the 1990 Amendments, stratospheric ozone depletion had moved from a controversial theory to a scientific certainty.³⁷⁴ Satellite monitoring had documented ozone loss over large areas of the planet,³⁷⁵ a massive seasonal hole larger than the continental United States had been discovered in the ozone layer over Antarctica,³⁷⁶ and the first important steps had been taken toward an international response with adoption in 1987 of the Montreal Protocol on Substances that Deplete the Ozone Layer (the Montreal Protocol)³⁷⁷ and its amendments.³⁷⁸

Propelled by widespread public concern, Congress established a sweeping and aggressive program to reduce and as

373. *Id.* § 407(c), 104 Stat. at 2614 (codified at 42 U.S.C.A. § 7651f(c)).

374. See *Hearing on Stratospheric Ozone Depletion Before the Subcomm. on Health and the Environment of the House Comm. on Energy and Commerce*, 101st Cong., 2d Sess. (1990).

375. *Id.* at 1.

376. *Id.* The ozone hole was originally reported in *Nature* in 1985. Farman, Gardiner & Schaublin, *Seasonal ClO_x, NO_x Interaction*, 315 *NATURE* 207-10 (1985).

377. 1987 Montreal Protocol on Substances that Deplete the Ozone Layer, opened for signature Sept. 16, 1987, 26 I.L.M. 1541 (1987) (entered into force Jan. 1, 1989). This document is a protocol to the 1985 Vienna Convention for the Protection of the Ozone Layer, opened for signature Mar. 22, 1985, 26 I.L.M. 1529 (entered into force Sept. 1, 1988). For further discussion of title VI and its international implications, see Shimberg, *Stratospheric Ozone and Climate Protection: Domestic Legislation and the International Process*, 21 *ENVTL. L.* 2175 (1991).

378. Montreal Protocol Parties: Adjustments and Amendments to the Montreal Protocol on Substances that Deplete the Ozone Layer, adopted on June 29, 1990, 30 I.L.M. 587 (1991). Congressional debate over the CAA had a major impact on the international negotiations. During the international discussions, the Bush Administration had initially taken a position opposing inclusion of a phase-out requirement for methyl chloroform, effectively blocking such a program. However, passage of the methyl chloroform phase-out requirements in both houses of Congress in the spring of 1990 convinced the Administration to reverse its position so that U.S. businesses were not placed at a competitive disadvantage. Pressure from the Administration became a critical factor in the adoption of a methyl chloroform phase-out program in the London amendments to the Protocol. *U.S. Drops Opposition to CFC Phase Out Fund*, Wash. Post, June 16, 1990, at A1, col. 2.

promptly as possible, eliminate the release of ozone-depleting chemicals from the United States. This program, in title VI of the 1990 Amendments, includes a phase-out of all ozone-depleting compounds, as well as recycling requirements, labeling requirements, bans of certain nonessential uses, and a program to promote the development of safe alternatives to ozone-depleting chemicals.³⁷⁶

1. *The Phase-Out of Ozone-depleting Chemicals*

The heart of the ozone protection program is the scheduled phase-out of the production and consumption of ozone-depleting chemicals. The more destructive ozone-depleting chemicals, including CFCs, halons, methyl chloroform and carbon tetrachloride, are designated as class I substances.³⁸⁰ These substances are

379. The title VI program compares favorably with the mandates of the international program for protection of the ozone layer in the Montreal Protocol, as revised in London. Like the CAA program, article 2 of the Protocol phases out most class I substances by 2000. Montreal Protocol on Substances that Deplete the Ozone Layer, *opened for signature* Mar. 22, 1985, 26 I.L.M. 1529, 1541, 1552 (1987) (entered into force Sept. 1988), *amended* by Montreal Protocol Parties, Adjustments and Amendments to the Montreal Protocol on Substances that Deplete the Ozone Layer, *adopted* on June 29, 1990, 30 I.L.M. 537 (1991). Title VI phases out methyl chloroform by 2002. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 602(a), § 604(a)-(b), 104 Stat. 2399, 2655-56 (codified at 42 U.S.C.A. § 7671(c)-(b) (West Supp. 1991)). However, the Protocol does not phase out methyl chloroform until 2005. Montreal Protocol Parties, Adjustments and Amendments to the Montreal Protocol on Substances that Deplete the Ozone Layer, article 2E, *adopted* on June 29, 1990, 30 I.L.M. 537, 545 (1991). Further, the interim reductions required before 2000 under the Protocol are less stringent than those required under the 1990 Amendments. Compare Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 602, § 604(a) tab. A, 104 Stat. at 2655 (codified at 42 U.S.C.A. § 7671(c) tab. A) with Montreal Protocol on Substances that Deplete the Ozone Layer, article 2, 26 I.L.M. at 1552-53, *amended* by Montreal Protocol Parties, Adjustments and Amendments to the Montreal Protocol on Substances that Deplete the Ozone Layer, *adopted* on June 29, 1990, 30 I.L.M. 537. In addition, unlike the 1990 Amendments, the Protocol does not require recycling of ozone-depleting substances. Finally, and most significantly, the Protocol does not, at present, include a program addressing the threat to the ozone layer posed by class II substances. In fact, in adoption of the class II phase-out program, Congress sought to promote adoption of an international program to address these substances through the Montreal Protocol.

380. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 602(a), § 602(a), 104 Stat. 2399, 2650-51 (codified at 42 U.S.C.A. § 7671(a) (West Supp. 1991)).

placed on an aggressive phase-out schedule that entirely bans their production by the year 2000, with the exception of methyl chloroform which is to be phased out by 2002.³⁸¹ Section 604(a) establishes a graduated schedule of annual reduction requirements for production and consumption of class I substances that will continually ratchet down until the complete ban takes effect.³⁸²

Other less destructive ozone-depleting chemicals are designated class II substances.³⁸³ In the short term, many of these substances may serve as substitutes that facilitate the phase-out of class I chemicals. In the long term, however, class II substances also pose a serious risk to the stratosphere, and they too are subject to a phase-out schedule, albeit one that is more attenuated.³⁸⁴ The production of class II substances is to be frozen in the year 2015.³⁸⁵ The production of class II substances for use in new equipment is also to be banned in 2015, with the exception that class II substances may continue to be used in new refrigeration equipment until the year 2020.³⁸⁶ After 2030, the production and consumption of class II substances will be entirely banned.³⁸⁷

EPA is authorized and directed to expedite the phase-out schedule for both class I and class II substances if new scientific information, or new international agreements, warrant more stringent measures.³⁸⁸

381. *Id.* § 604(e) tab. A, 104 Stat. at 2655 (codified at 42 U.S.C.A. § 7671(c) tab. A).

382. *Id.*

383. *Id.* § 602(b), 104 Stat. at 2651 (codified at 42 U.S.C.A. § 7671a(b)).

384. *Id.* sec. 602(a), § 605, 104 Stat. at 2658-60 (codified at 42 U.S.C.A. § 7671(d)).

385. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 602(a), § 605(b)(1), 104 Stat. 2399, 2659 (codified at 42 U.S.C.A. § 7671d(b)(1) (West Supp. 1991)). The freeze is against a baseline year selected by EPA.

386. *Id.* § 605(a), 104 Stat. at 2658-59 (codified at 42 U.S.C.A. § 7671d(a)). Section 605(a) also permits the use of class II substances that have been used, recovered, and recycled. *Id.* § 605(a)(1), 104 Stat. at 2658 (codified at 42 U.S.C.A. § 7671d(a)(1)).

387. *Id.* § 605(b)(2), 104 Stat. at 2659 (codified at 42 U.S.C.A. § 7671d(b)(2)).

388. *Id.* § 606, 104 Stat. at 2660 (codified at 42 U.S.C.A. § 7671e). Citizens may petition EPA to promulgate the expedited schedule and EPA must act on that petition within 180 days. *Id.* § 606(b), 104 Stat. at 2660 (codified at 42 U.S.C.A. § 7671e(b)).

2. *Recycling, Use, and Disposal*

Section 608 establishes a sweeping program to mandate the recycling of class I and II substances, and to require, where possible, reductions in the use of these substances.³⁸⁸ By 1992, EPA must promulgate regulations providing for recycling of class I substances.³⁸⁹ Additional regulations, covering class II substances as well, are to be promulgated within four years of enactment.³⁹¹ The regulations for class II substances are to reduce the use and emission of class I and II substances to the "lowest achievable level,"³⁹² and to "maximize the recapture of such substances."³⁹³

Section 608 also bans the knowing release or venting of any class I or II substance into the environment.³⁹⁴ This ban applies, as well, to substitutes used in place of class I or class II substances, unless the Administrator determines that venting of the substitute does not pose a threat to the environment.³⁹⁵

A separate program is established to assure that the release of ozone-depleting compounds in the servicing of motor vehicles is minimized. Effective in 1992 for large service stations, and in 1993 for smaller ones, it will be illegal for repair establishments to service motor vehicle air conditioners except at facilities using approved refrigerant recycling equipment operated by trained and certified personnel.³⁹⁶

388. *Id.* § 608, 104 Stat. at 2661-62 (codified at 42 U.S.C.A. § 7671g).

389. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 602(a), § 608(a)(1), 104 Stat. at 2661 (codified at 42 U.S.C.A. § 7671g(a)(1) (West Supp. 1991)).

391. *Id.* § 608(a)(2), 104 Stat. at 2661 (codified at 42 U.S.C.A. § 7671g(a)(2)).

392. *Id.* § 608(a)(3)(A), 104 Stat. at 2661 (codified at 42 U.S.C.A. § 7671g(a)(3)(A)).

393. *Id.* § 608(a)(3)(B), 104 Stat. at 2661 (codified at 42 U.S.C.A. § 7671g(a)(3)(B)). In implementing these directives, the Administrator is specifically authorized to require the use of substitutes for listed substances. *Id.* § 608(a)(3), 104 Stat. at 2661 (codified at 42 U.S.C.A. § 7671g(a)(3)).

394. *Id.* § 608(c), 104 Stat. at 2662 (codified at 42 U.S.C.A. § 7671g(c)).

395. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 602(a), § 608(c)(2), 104 Stat. 2399, 2662 (codified at 42 U.S.C.A. § 7671g(c)(2) (West Supp. 1991)). The application of § 608 to substitutes is an effort to assure that recycling initiatives resulting from the ban on venting, as well as from the other requirements of § 608, are continued as the nation shifts to substitutes that, while not a threat to the stratosphere, may contribute to global warming or have toxic qualities.

396. *Id.* § 609, 104 Stat. at 2662-64 (codified at 42 U.S.C.A. § 7671h). The

3. *Labeling*

Thirty months after enactment of the 1990 Amendments, all products containing a class I substance must be labeled.³⁹⁷ The label must be "clearly legible and conspicuous," and must inform the consumer that the product contains a chemical that "harms public health and the environment by destroying ozone in the upper atmosphere."³⁹⁸ Labels will also be required for products containing, or made with, a class II substance once the Administrator determines that substitutes for the use of the class II substances are available.³⁹⁹ Further, all products containing, or made with, any class I or II substance must be labelled after January 1, 2015.⁴⁰⁰

The labeling requirements are intended to allow consumers to make informed choices regarding whether to purchase or use products that cause the release of ozone-depleting substances. It is hoped that the result will be a consumer shift away from such

1990 Amendments contain other programs to reduce the use of ozone-depleting compounds. Section 610 bans the sale or distribution in interstate commerce of nonessential products that release class I substances into the environment. The ban is effective two years after enactment of the 1990 Amendments, and applies to products identified by EPA in regulations due one year after enactment. *Id.* § 610(a)-(b), 104 Stat. at 2664 (codified at 42 U.S.C.A. § 7671i(a)-(b)). Certain products, such as CFC-propelled party streamers and noise horns, and CFC-containing cleaning fluids for noncommercial electronic and photographic equipment, are statutorily identified as nonessential. In determining whether a product should be designated nonessential, EPA is to consider the intended purpose of the product, and the technological availability of substitutes. For class I substances, EPA must also consider "safety, health, and other relevant factors." *Id.* § 610(b), 104 Stat. at 2664-65. Effective January 1, 1994, the distribution or sale of other specifically identified products is banned, including aerosol or pressurized products containing class II substances, and plastic foam products containing or manufactured with class II substances. *Id.* § 610(d), 104 Stat. at 2665 (codified at 42 U.S.C.A. § 7671i(d)).

397. *Id.* § 611, 104 Stat. at 2665-66 (codified at 42 U.S.C.A. § 7671j). Labeling is required for products made with class I substances effective 30 months after enactment, unless the Administrator determines that there are no substitute products or manufacturing processes that do not rely on use of a class I substance. In addition, all containers used to store class I and class II substances must be labelled. *Id.*

398. *Id.* § 611(b), 104 Stat. at 2665 (codified at 42 U.S.C.A. § 7671j(b)).

399. *Id.* § 611(c), 104 Stat. at 2665 (codified at 42 U.S.C.A. § 7671j(c)).

400. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 602(a), § 611(b)-(d), 104 Stat. 2399, 2665-66 (codified at 42 U.S.C.A. § 7671j(b)-(d) (West Supp. 1991)).

products, and toward more environmentally benign alternatives.

4. Safe Alternatives

Section 612 establishes a program to assure that class I and II substances will be replaced by chemicals, product substitutes, or alternative manufacturing processes that reduce overall risks to public health and the environment.⁴⁰¹ Within two years of enactment, the Administrator is to publish rules prohibiting the use of alternatives to class I or II substances if those alternatives may present a risk of health or environmental effects and a safer alternative is currently or potentially available.⁴⁰² EPA is to publish a list of specific uses of substances prohibited under section 612 and a list of substances identified as safe alternatives for specific uses.⁴⁰³

5. International Provisions

Title VI includes several measures to facilitate compliance with the Montreal Protocol by the United States and by other nations. These measures include provisions authorizing financial assistance to help developing nations comply with the Montreal Protocol,⁴⁰⁴ and provisions directing EPA to fully implement the obligations of the United States under the Montreal Protocol.⁴⁰⁵ In addition, and perhaps most significantly, section 614(c) directs the President to immediately prohibit the export of technologies used to produce class I substances and to prohibit direct or indirect investment in facilities designed to produce class I or class II substances in nations that are not parties to the Montreal Protocol.⁴⁰⁶ All forms of U.S. government assistance to other nations

for the purpose of producing any class I substance are also banned.⁴⁰⁷

G. Titles V and VII: Permits and Enforcement

Titles V and VII of the 1990 Amendments establish important new programs for permitting and enforcement. Together, they erect a new regulatory infrastructure for implementing the substantive requirements of the CAA. They promise to make the requirements of the CAA far more certain and enforceable than ever before.

1. The Permit Program

Title V of the 1990 Amendments establishes a comprehensive permit program for stationary sources. It effects a major change from existing practice. Under the pre-1990 CAA, air pollution permits were required in only two circumstances: in nonattainment areas, new industrial sources with annual emissions above 100 tons were required to obtain permits under section 173,⁴⁰⁸ and in attainment areas, new industrial sources with annual emissions above 250 tons (plus a limited list of new sources with annual emissions above 100 tons) were required to obtain permits under section 165.⁴⁰⁹

By contrast, title V expands the permitting requirements of the CAA dramatically. It requires all major sources to obtain permits from state air pollution agencies, regardless of whether the source is a new source or an existing source.⁴¹⁰ The term "major

§ 7671m(c)(1)-(2)).

407. *Id.* § 614(c)(3), 104 Stat. at 2669 (codified at 42 U.S.C.A. § 7671m(c)(3)).

408. CAA §§ 172, 173, 42 U.S.C. §§ 7502, 7503 (1988), amended by Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 102(b), (c), §§ 172, 173, 104 Stat. at 2412-17 (codified at 42 U.S.C.A. §§ 7502, 7503).

409. CAA § 165, 42 U.S.C. § 7475. This permitting program applied to "major emitting facilities," a term defined in § 169(1), 42 U.S.C. § 7479(1), amended by Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 305(b), § 169(1), 104 Stat. at 2583 (codified at 42 U.S.C.A. § 7479).

410. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 501, § 502(a), 104 Stat. 2399, 2635-36 (codified at 42 U.S.C.A. § 7661a(a) (West Supp. 1991)). Section 502(a) provides that the Administrator is not authorized to exempt any major source from the permit requirements of title V. *Id.*

401. *Id.* § 612, 104 Stat. at 2667-68 (codified at 42 U.S.C.A. § 7671k).

402. *Id.* § 612(c), 104 Stat. at 2667 (codified at 42 U.S.C.A. § 7671k(c)).

403. *Id.*

404. *Id.* § 617(b), 104 Stat. at 2670 (codified at 42 U.S.C.A. § 7671p). White House opposition to such funding assistance was a central reason for U.S. opposition to efforts to strengthen the Montreal Protocol in early 1990. Eventually, under intense public pressure, and strong diplomatic pressure from other nations, the United States agreed to support the aid program. See generally Shinnberg, *supra* note 377.

405. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 602(a), § 614(b), 104 Stat. 2399, 2668 (codified at 42 U.S.C.A. § 7671m(b) (West Supp. 1991)).

406. *Id.* § 614(c)(1)-(2), 104 Stat. at 2668-69 (codified at 42 U.S.C.A.

source" is defined broadly to include all sources with annual emissions of ten or more tons of any hazardous air pollutant, and all other sources with annual emissions of 100 or more tons of any air pollutant.⁴¹¹ In nonattainment areas and ozone transport regions under part D, sources with annual emissions of seventy, fifty, twenty-five, or ten tons may also be considered major sources, depending upon the pollutant involved and the classification of the area.⁴¹²

If the state fails to implement the required permit program, it is subject to mandatory sanctions.⁴¹³ In each such case, EPA

411. *Id.* § 501(2), 104 Stat. at 2635 (codified at 42 U.S.C.A. § 7661(2)). CAA § 501(2) provides that the term "major source" includes sources that fit within definitions of that term provided in § 112, § 302, and part D of title I. Section 112(a)(1) provides that a major source is any source emitting, or with potential to emit, 10 tons of any listed hazardous air pollutant or 25 tons of any combination of hazardous air pollutant listed in § 112(b). *Id.* § 112(a)(1), (b)(1), 104 Stat. at 2531, 2532-35 (codified at 42 U.S.C.A. § 7412(a)(1), (b)(1)). Section 302(f) provides that a major source is a source emitting more than 100 tons of any air pollutant. 42 U.S.C. § 7602(f) (1988).

412. The ozone subpart in part D of title I establishes a graduated system in which sources of 50, 25 or 10 tons are considered major sources in serious, severe, and extreme ozone nonattainment areas, respectively. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 182(c), (d), (e), 104 Stat. at 2431, 2436-37, 2438 (codified at 42 U.S.C.A. § 7511a(c), (d), (e)). Other provisions of part D establish reduced thresholds for specific areas. *Id.* § 184(b)(2), 104 Stat. at 2449 (codified at 42 U.S.C.A. § 7511c(b)(2)) (defining major source within ozone transport regions as a source that emits or has the potential to emit 50 tons per year of VOCs); *id.* sec. 104, § 187(c)(1), 104 Stat. at 2456-57 (codified at 42 U.S.C.A. § 7412a(c)(1)) (defining major sources in CO nonattainment areas as any source that emits or has the potential to emit 50 tons per year of CO); *id.* sec. 105, § 189(b)(3), 104 Stat. at 2461 (codified at 42 U.S.C.A. § 7513a(b)(3)) (defining major sources in serious PM-10 areas as any source that emits or has the potential to emit 70 tons per year of PM-10).

In addition, the permit program applies to small "area" sources regulated under new § 112 and small sources regulated under § 111. *Id.* sec. 501, § 502(a), 104 Stat. at 2635-36 (codified at 42 U.S.C.A. § 7661a(a)). EPA may by rule exempt these sources from the permit program, if EPA determines that compliance would be impracticable or unnecessarily burdensome. *Id.* Somewhat modified permitting procedures apply to many small sources under § 507. *Id.* § 507, 104 Stat. at 2645-48 (codified at 42 U.S.C.A. § 7661f).

For a further discussion of title V's requirements, see Williamson, *Fitting Title V into the Clean Air Act: Implementing the New Operating Permit Program*, 21 ENVTL. L. 2085 (1991); Copeland, *Comprehensive Clean Air and Clean Water Permits: Is the Glass Still Just Half Full?*, 21 ENVTL. L. 2135 (1991).

413. If the state fails to submit a permit program or if EPA disapproves the program, EPA must impose sanctions no later than 18 months after the date re-

also is required to establish a federal permit program for the state.⁴¹⁴

The permit program must be self-funding. Section 502(b)(3) requires states to collect emission fees from permitted sources. These user fees collected from permitted sources are to pay for the cost of the program.⁴¹⁵

The expanded permit program established in title V has three fundamental objectives. First, the permit process serves to apply the substantive requirements of the CAA to individual sources. In some cases, such as MACT standards under section 112, this should be a straightforward matter of incorporating applicable emission standards promulgated by EPA in nationwide regulations.⁴¹⁶ However, in other cases, it will require the permitting authority to make case-by-case determinations under a general narrative standard. For instance, under section 182(b)(2), all moderate, serious, severe, and extreme nonattainment areas must require all major sources to implement RACT.⁴¹⁷ In cases where

quired for program submission. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 501, § 502(d)(2), 104 Stat. at 2639 (codified at 42 U.S.C.A. § 7661a(d)(2)). The applicable sanctions are the same as those that apply under part D when a state fails to submit, or EPA disapproves, a SIP. *Id.* (incorporating by reference the sanctions authorized in *id.* sec. 102(e), § 179, 104 Stat. at 2420-23 (codified at 42 U.S.C.A. § 7509)). EPA must either cut off highway funds throughout the noncomplying area or if the program deficiencies relate specifically to nonattainment requirements, impose increased offset ratios for new sources. *Id.* sec. 102(e), § 179, 104 Stat. at 2420-23 (codified at 42 U.S.C.A. § 7509).

414. If the sanctions do not bring the state into compliance, EPA must promulgate a federal permit program in full compliance with title V. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 501, § 502(d)(3), 104 Stat. 2639, 2639 (codified at 42 U.S.C.A. § 7661a(d)(3) (West Supp. 1991)). The federal program must be in effect two years after the date required for submission of the state program. *Id.*

415. *Id.* § 502(b)(3), 104 Stat. at 2636-37 (codified at 42 U.S.C.A. § 7661a(b)(3)). The fee amount is to be \$25 per ton of pollutant, and is to be used to support administration and enforcement of the permit program. *Id.* The permit fees should raise roughly \$300 million annually for state air pollution programs. State programs are expected to incur yearly program expenditures of some \$600 million. Telephone conversation between William Becker, Executive Director, State and Territorial Air Pollution Program Administrators and Gregory Wetstone (Apr. 5, 1991).

416. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 301, § 112(d), 104 Stat. at 2539-42 (codified at 42 U.S.C.A. § 7412(d)).

417. *Id.* sec. 103, § 182(b)(2), 104 Stat. at 2430 (codified at 42 U.S.C.A. § 7511a(b)(2)). Section 182(b)(2) governs the contents of SIPs for moderate

there are no relevant EPA guidelines or SIP requirements, the permitting authority must use the permitting process to determine the required level of emissions control.

Second, the permit process establishes monitoring and reporting requirements for assessing compliance. Under subsections 504(a) and 504(c), each permit must require the source to monitor its compliance status and to report the results to the permitting authority at least every six months.⁴¹⁸ As a result, for the first time in the history of the CAA, the states, EPA, and the public will know when sources are meeting their emission limitations, and when they are not.

Finally, the permit program provides increased opportunities for citizen involvement.⁴¹⁹ State permit programs must provide any person the opportunity to comment on proposed permit actions,⁴²⁰ to seek review in state court of the final action,⁴²¹ and to obtain court orders compelling the permitting authority to take final action on permit applications.⁴²² In addition, any person may petition EPA to object to a proposed state permit that does not meet the requirements of the CAA. EPA must act on such petitions within sixty days. If EPA denies the petition, the petitioner may seek judicial review in federal appellate courts.⁴²³

nonattainment areas. Its requirements are incorporated into the SIP requirements for serious, severe, and extreme nonattainment areas by *id.* § 182(c), (d), (e), 104 Stat. at 2431, 2436-37, 2438 (codified at 42 U.S.C.A. § 7511a(c), (d), (e)).

418. *Id.* § 504(a), (c), 104 Stat. at 2642 (codified at 42 U.S.C.A. § 7661c(a), (c)).

419. Title V also extends the opportunities for public participation to other states. Any state within 50 miles of a source and any contiguous state whose air quality may be affected must receive notification of the proposed permit for that source. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 501, § 505(a)(2), 104 Stat. 2399, 2643 (codified at 42 U.S.C.A. § 7661d(a)(2) (West Supp. 1991)). Further, because states are within the definition of "person" under CAA § 302(e), 42 U.S.C. § 7603(e) (1988), any state (whether within 50 miles or not) may use the opportunities for public participation to challenge permits. Thus, a state may use the § 505(b)(2) process to challenge permits at EPA and in court. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 501, § 505(b)(2), 104 Stat. at 2643-44 (codified at 42 U.S.C.A. § 7511a(b)(2)).

420. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 501, § 502(b)(6), 104 Stat. at 2638 (codified at 42 U.S.C.A. § 7661a(b)(6)).

421. *Id.*

422. *Id.* § 502(b)(7), 104 Stat. at 2638 (codified at 42 U.S.C.A. § 7661a(b)(7)).

423. *Id.* § 505(b)(2), 104 Stat. at 2643-44 (codified at 42 U.S.C.A. § 7661d(b)(2)).

2. *New Enforcement Authorities*

As a complement to the new permitting requirements, title VII of the 1990 Amendments comprehensively revises the enforcement authorities of the CAA. The new provisions give EPA authority to assess civil penalties, stiffen criminal penalties, and expand the authority and effectiveness of citizen suits.

The most important reforms in title VII of the 1990 Amendments are the changes to the CAA citizen suit provision—section 304.⁴²⁴ The pre-1990 CAA allowed citizens to commence civil actions against "any person . . . who is alleged to be in violation of . . . an emission standard" under the CAA.⁴²⁵ However, citizens brought few actions under this authority. The pre-1990 CAA did not require sources to report on their compliance status, so it proved difficult for citizens to assess—let alone prove in court—whether regulated sources complied with applicable emission standards.⁴²⁶ In addition, citizens could seek only injunctive relief under pre-1990 CAA section 304.⁴²⁷ Citizens thus lacked the ability to seek civil fines, which would have increased the leverage that citizens could bring to bear in enforcement actions.

The 1990 Amendments correct both of these problems. First, the permit program requires sources to report regularly on their compliance status.⁴²⁸ These reports will provide readily accessible information that citizens can use to determine the compliance status of sources. In addition, the 1990 Amendments for the first time authorize citizens to seek civil fines. The majority of these fines will be placed into the U.S. Treasury for EPA to use in enforcing the CAA.⁴²⁹ However, under new section 304(g)(2), up to

424. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 707, § 304, 104 Stat. 2399, 2682-84 (codified at 42 U.S.C.A. § 7604 (West Supp. 1991)).

425. CAA § 304(a)(1), 42 U.S.C. § 7604(a)(1) (1988), amended by Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 707(g), § 304(a)(1), 104 Stat. at 2683 (codified at 42 U.S.C.A. § 7604(a)(1)).

426. See Buente, *supra* note 92.

427. CAA § 304(a), 42 U.S.C. § 7604(a) (1988), amended by Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 707(a), § 304(a), 104 Stat. at 2682 (codified at 42 U.S.C.A. § 7604(a)).

428. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 501, § 504(a), 104 Stat. at 2642 (codified at 42 U.S.C.A. § 7661c(a)).

429. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 707(b), § 304(g)(1), 104 Stat. 2399, 2682 (codified at 42 U.S.C.A. § 7604(g)(1) (West Supp. 1991)).

one hundred thousand dollars of any civil fines awarded by the court may be devoted to "mitigation projects which are consistent with the Act and enhance the public health or the environment."⁴³⁰ The capacity of citizens to seek civil fines should have a substantial practical impact. It gives violators large incentives to settle citizen suits expeditiously, and it gives all sources important incentives to avoid violations in the first place.⁴³¹

The 1990 Amendments also increase EPA's enforcement authority. The most important innovation is authority for EPA to assess civil fines administratively under new section 113(d). For the first time, EPA can levy fines of up to two hundred thousand dollars without initiating a court proceeding.⁴³²

In addition, the 1990 Amendments expand criminal enforcement authorities. Certain knowing violations of the CAA are now punishable as felonies.⁴³³ New criminal sanctions are created for illegal negligent and intentional releases of hazardous air pollu-

430. *Id.* § 304(e)(2), 104 Stat. at 2682-83 (codified at 42 U.S.C.A. § 7604(e)(2)).

431. A major aspect of the new citizen authority to seek civil fines is explicit authority to seek fines for past violations. A 1987 decision of the Supreme Court in *Gwaltney of Smithfield Ltd. v. Chesapeake Bay Found., Inc.*, 484 U.S. 49 (1987), limited the ability of citizens to seek civil fines under the Clean Water Act to cases where the citizen can allege ongoing violations. The 1990 Amendments reject this limitation. Instead, new § 304 provides that citizens can seek civil fines for a past violation so long as the violation has been "repeated." Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 707(g), § 304(a), 104 Stat. at 2683 (codified at 42 U.S.C.A. § 7604(g)). Thus, the intent is that if a violation has occurred more than once, citizens may seek civil fines.

For contrasting views on the application of *Gwaltney* to the new § 304, see *Buente*, *supra* note 92, at 2234, 2237; *Alushin*, *supra* note 92, at 2227-28. President's Statement on Signing the Bill Amending the Clean Air Act, 26 WEEKLY COMP. PRES. DOC. 1824, 1825 (Nov. 15, 1990) ("Congress has codified the Supreme Court's interpretation of [the citizen suit provision] in the *Gwaltney* case.").

432. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 701, § 113(d)(1), 104 Stat. at 2677 (codified at 42 U.S.C.A. § 7413(d)(1)). In general, EPA must assess the penalties within one year of the first day of violation. However, if the Administrator and the Attorney General concur that higher civil penalties and longer violations are appropriate, EPA can proceed to assess the penalties. *Id.* EPA must provide notice, an opportunity for hearing, and reasonable discovery. *Id.* § 113(d)(2)(A), 104 Stat. at 2677-78 (codified at 42 U.S.C.A. § 7413(d)(2)(A)).

433. *Id.* § 113(c)(1), 104 Stat. at 2675 (codified at 42 U.S.C.A. § 7413(c)(1)). For more detailed explanation of the new criminal enforcement provisions, see *Alushin*, *supra* note 92, at 2218-22.

tants.⁴³⁴ New criminal sanctions are also created for omitting material information in required reports or failing to report.⁴³⁵

VI. SIZING UP THE 1990 AMENDMENTS

To fairly assess the 1990 Amendments is it necessary to take a long-term perspective—to evaluate how the 1990 Amendments measure against the proposals that were the focus of the decade-long clean air debate. Probably the most striking feature of the legislation is its broad scope. Surprisingly, given the vigor of industry opposition to new controls through the long clean air battle, the 1990 Amendments include programs to address each of the environmental issues debated through the 1980s. Discrete and extensive new programs are included to grapple with high ambient pollution levels (urban and regional smog), hazardous air pollution, acid rain, and depletion of the stratospheric ozone layer. Each of these programs is tailored to the problem it seeks to address, and each is quite different in its approach.

However, the central questions is, of course, not just whether the problems will be addressed, but whether they will be addressed effectively. This is not an easy issue to evaluate. Once again, it is instructive to look for comparison to the most aggressive proposals debated in earlier Congresses. In this case, the historical record tells a striking tale. Despite the fact that they are the product of extensive negotiations and compromise, the new programs in the 1990 Amendments have comparable or greater stringency than the controversial legislative proposals under debate, and vehemently opposed by industry, throughout the 1980s. Remarkably, in many areas, the 1990 Amendments actually surpass in scope and stringency the earlier proposals.⁴³⁶

434. Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 701, § 113(c)(3)-(5), 104 Stat. 2676-77 (codified at 42 U.S.C.A. § 7413(c)(3)-(5) (West Supp. 1991)).

435. *Id.* § 113(d)(2), 104 Stat. at 2675 (codified at 42 U.S.C.A. § 7513(d)(2)).

436. In fact, many of the Amendments' strongest features appeared for the first time in the final two years of debate. Key elements that originated only in the last two-year Congressional cycle include: requirements for the reformulation of gasoline, mandates for the development of clean fuel vehicles in fleets and California, the cap on SO₂ emissions, requirements to reformulate consumer and commercial products to reduce emissions, directives for the control of area sources of air toxics, and the new permit and enforcement provisions.

Probably the best example of this surprising turn is the mobile source program, which historically has been a source of great controversy. In the 100th Congress, Representative Waxman joined with Representative Jerry Lewis (R. Cal.) to introduce H.R. 3054, which at that time was the most comprehensive proposal ever introduced to strengthen mobile source controls. Its mandatory onboard vapor recovery to capture refueling emissions, reduced fuel volatility, a rudimentary program for clean fuel vehicles, and controls on nonroad vehicles.⁴³⁷

The debate over H.R. 3054 was fierce. Motor vehicle manufacturers argued that "achievement of the mobile source requirements in H.R. 3054 is simply beyond the reach of any known or envisioned technology."⁴³⁸ Oil companies called the legislation "cumbersome, expensive, and unworkable" and argued that it could "trigger economic downturns in many areas."⁴³⁹ Ultimately, H.R. 3054 met the same fate as the range of clean air proposals in the 1980s. It died in Committee because of industry opposition. As a result, the 100th Congress ended with no action on clean air.

Yet, in retrospect, the motor vehicle control requirements of H.R. 3054 seem almost unambitious. Unlike the 1990 Amendments, H.R. 3054 did not require reformulation of gasoline⁴⁴⁰ or the use of oxygenated fuels.⁴⁴¹ H.R. 3054 did not establish tier II tailpipe standards for passenger cars,⁴⁴² did not comprehensively tighten tailpipe standards for light-duty trucks,⁴⁴³ did not regu-

437. H.R. 3054, 100th Cong., 1st Sess., title II (1987) (introduced July 29, 1987).

438. *Clean Air Standards: Hearing on Clean Air Act Amendments Before the Subcomm. on Health and the Environment of the House Comm. on Energy and Commerce*, 100th Cong., 1st Sess. 254 (1987) (testimony of Donald R. Buist, Ford Motor Company).

439. *Id.* at 327 (testimony of William F. O'Keefe, American Petroleum Institute).

440. *Compare* Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 219, § 211(k), 104 Stat. 2399, 2492-97 (codified at 42 U.S.C.A. § 7545(k) (West Supp. 1991)).

441. *Compare id.* § 211(m), 104 Stat. at 2498-500 (codified at 42 U.S.C.A. § 7545(m)).

442. *Compare id.* sec. 203(a), § 202(i), 104 Stat. at 2476-78 (codified at 42 U.S.C.A. § 7521(i)).

443. *Compare id.* § 202(h), 104 Stat. at 2475-76 (codified at 42 U.S.C.A. § 7521(h)).

late cold-temperature motor vehicle emissions,⁴⁴⁴ and did not require controls on evaporative emissions and running losses⁴⁴⁵ or the use of onboard emission control diagnostic systems.⁴⁴⁶ Nor did H.R. 3054 extend durability requirements to ten years or one hundred thousand miles,⁴⁴⁷ or establish a program to control toxic emissions from motor vehicles.⁴⁴⁸

It is also true that, in comparison to prior legislative proposals, the 1990 Amendments include far more aggressive stationary source programs for the control of smog. The leading proposal for control of urban smog in the House prior to the 101st Congress was, once again, H.R. 3054.⁴⁴⁹ Although it had more aggressive attainment deadlines than the smog program in the 1990 Amendments, its regulatory reach was far more limited. Its ozone provisions, for instance, did not regulate small existing VOC sources,⁴⁵⁰ did not mandate reformulation of consumer and commercial products,⁴⁵¹ and did not regulate existing sources of NO_x.⁴⁵² Also, unlike the 1990 Amendments, H.R. 3054 did not comprehensively strengthen transportation planning requirements in nonattainment areas.⁴⁵³ Finally, H.R. 3054 included no standards for new and existing sources of PM-10. In fact, H.R. 3054 did not contain a program for achievement of the PM-10 standard.⁴⁵⁴

444. *Compare id.* § 202(j), 104 Stat. at 2479-80 (codified at 42 U.S.C.A. § 7521(j)).

445. *Compare* Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 205, § 202(k), 104 Stat. 2399, 2480 (codified at 42 U.S.C.A. § 7521(k) (West Supp. 1991)).

446. *Compare id.* sec. 207(a), § 202(m), 104 Stat. at 2481-82 (codified at 42 U.S.C.A. § 7521(m)).

447. *Compare id.* sec. 203(b), § 202(d), 104 Stat. at 2478 (codified at 42 U.S.C.A. § 7521(d)).

448. *Compare id.* sec. 206, § 202(l), 104 Stat. at 2481 (codified at 42 U.S.C.A. § 7521(l)).

449. H.R. 3054, 100th Cong., title I (introduced July 29, 1987).

450. *Compare* Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 103, § 182(c), (d), (e), 104 Stat. 2399, 2436-37, 2438 (codified at 42 U.S.C.A. § 7511a(c), (d), (e) (West Supp. 1991)).

451. *Compare id.* § 183(e), 104 Stat. at 2444-47 (codified at 42 U.S.C.A. § 7511b(e)).

452. *Compare id.* § 182(f), 104 Stat. at 2439-40 (codified at 42 U.S.C.A. § 7511a(f)).

453. *Compare id.* secs. 101(f), 103, §§ 176(c), 182(c)(5), (d)(1), 104 Stat. at 2409-12, 2435, 2437 (codified at 42 U.S.C.A. § 7506(c), 7511a(c)(5), (d)(1)).

454. *Compare id.* sec. 105(a), §§ 188-190, 104 Stat. at 2458-62 (codified at 42 U.S.C.A. §§ 7513-7513b).

A similar analysis applies to other major titles in the 1990 Amendments. In the case of acid rain, the environmentalists' leading proposal prior to the 101st Congress had been H.R. 4567, which was successfully killed in the 99th Congress by a multimillion dollar utility industry lobbying campaign.⁴⁵⁵ Yet, unlike the 1990 Amendments, H.R. 4567 contained no permanent cap on SO₂ emissions by either utilities or industrial sources.⁴⁵⁶ In fact, H.R. 4567 looked so attractive to the utility industry in comparison to the 1990 Amendments that in the fall of 1989, in perhaps the most ironic moment of the clean air debate, the Edison Electric Institute actually urged Congress to reject the 1990 Amendments' acid rain program, and adopt instead a substitute program which, in essence, resurrected H.R. 4567.⁴⁵⁷

The case can also be made with regard to hazardous air pollution, although it is somewhat less clear. The leading proposal for control of toxic emissions in the House prior to the 101st Congress was H.R. 2576 of the 99th Congress.⁴⁵⁸ H.R. 2576 imposed extremely stringent emissions standards for industrial sources, but its proposals for control of emissions of hazardous air pollutants applied to fewer than half of the pollutants covered by the 1990 Amendments. And, unlike the 1990 Amendments, it had no special programs for the control of hazardous air pollutants from small area sources, the control of incinerator emissions, or the protection of the Great Lakes.⁴⁵⁹

Along the same lines, there is the regime for protection of the stratospheric ozone layer in title VI of the 1990 Amendments. The leading proposal for control of stratospheric ozone depletion in the House prior to the 101st Congress was H.R. 2036 of the 100th Congress.⁴⁶⁰ However, H.R. 2036 contained no provisions other than a phase out of CFCs and other class I substances. Unlike the 1990 Amendments, it did not require EPA to set emission standards applicable to persons that use ozone-depleting substances, or ban the venting of such substances.⁴⁶¹ It did not man-

455. See *supra* notes 22-23 and accompanying text.

456. H.R. 4567, 99th Cong., 2d Sess. (1986) (introduced Apr. 10, 1986).

457. Edison Elec. Inst., Proposed Amendments to Title V (Oct. 31, 1989).

458. H.R. 2576, 99th Cong., 1st Sess. (1985) (introduced May 22, 1985).

459. *Id.*

460. H.R. 2036, 100th Cong., 1st Sess. (1987) (introduced Apr. 9, 1987).

461. Compare Clean Air Act Amendments of 1990, Pub. L. No. 101-549, sec. 602(a), § 608(b)-(c), 104 Stat. 2399, 2662 (codified at 42 U.S.C.A. § 7671g(b)-(c))

date recycling⁴⁶² or establish labeling requirements.⁴⁶³ Nor did it contain a program to phase-out the use of hydrochlorofluorocarbons and other class II substances that may be used as short term replacements for CFCs, but pose a long term threat to the stratosphere.⁴⁶⁴

Similarly, the comprehensive permit program in title V of the 1990 Amendments simply had no counterpart in any earlier legislative proposals. Nor had any earlier legislative proposal expanded the reach of citizen suits and bolstered enforcement authority as significantly as the 1990 Amendments.

What, then, did industry achieve as a result of the millions of dollars spent lobbying, and the years of aggressive opposition to clean air proposals? Mainly delay, it seems. If H.R. 3054 had been enacted as introduced, automobile manufacturers would have had to comply fully with tier I tailpipe standards by model year 1992, as opposed to the phase-in schedule in the 1990 Amendments that begins two model years later. If H.R. 4567 had been enacted as introduced, utilities would have had to cut their SO₂ emissions three years earlier than required in the 1990 Amendments (but would have faced no emission cap). Likewise, the 1990 Amendments extended attainment deadlines for smoggy cities, compliance deadlines for toxic sources, and the phase-out deadline for production of CFCs.

But as the above comparison of the 1990 Amendments with earlier legislative proposals starkly demonstrates, this delay had a steep price. As the clean air debate dragged on, the deficiencies of the pre-1990 CAA became more apparent. The public's demand for a clean air bill became stronger, and the legislative proposals became broader and more stringent. The cycle of escalation finally ended with the passage of the 1990 Amendments.

The 1990 Amendments were too long in coming and, regretfully, the long debate stalled much-needed reforms and delayed protection of public health and the environment. Yet, in the end,

(West Supp. 1991).

462. Compare *id.* § 608(a), 104 Stat. at 2661 (codified at 42 U.S.C.A. § 7671g(a)).

463. Compare *id.* § 611, 104 Stat. at 2665-66 (codified at 42 U.S.C.A. § 7671i).

464. Compare *id.* § 605, 104 Stat. at 2658-60 (codified at 42 U.S.C.A. § 7671d).

the scope and depth of the 1990 Amendments exceeds even our most optimistic expectations from earlier years. While there is every indication that the legislation finally passed was worth the wait, the real test, once again, will be its success in reducing or eliminating the range of pressing public health and environmental problems it was designed to address. Thus, it will be many years before we can definitely evaluate the true effectiveness of the 1990 Amendments.

In the meantime, proponents of clean air must do far more than sit back and wait. EPA faces an arduous implementation effort that will be made more difficult by pressures from affected industries, and interference from hostile sectors of the Administration.⁴⁶⁵ Vigilant and aggressive oversight will be needed to assure that the law is implemented as Congress intended, despite industry pressures on EPA. Also, Congress must stand ready to legislate further if required to assure that the 1990 Amendments' objectives are achieved. The fight for clean air is not over, but we have accomplished a great deal in mapping out a detailed and enforceable plan of attack.

465. See *Implementation of the Clean Air Act, Hearings Before the Subcommittee on Health and the Environment of the Comm. on Energy and Commerce*, 102d Cong., 1st Sess. (1991). At this hearing, subcommittee members expressed concern about interference with EPA rule makings by the White House Office Management and Budget, and the White House Counsel on Competitiveness. See also Latin, *Regulatory Failure, Administrative Incentives, and the New Clean Air Act*, 21 ENVTL. L. 1649 (1991); Oren, *The Clean Air Act Amendments of 1990: A Bridge to the Future?*, 21 ENVTL. L. 1819 (1991).